



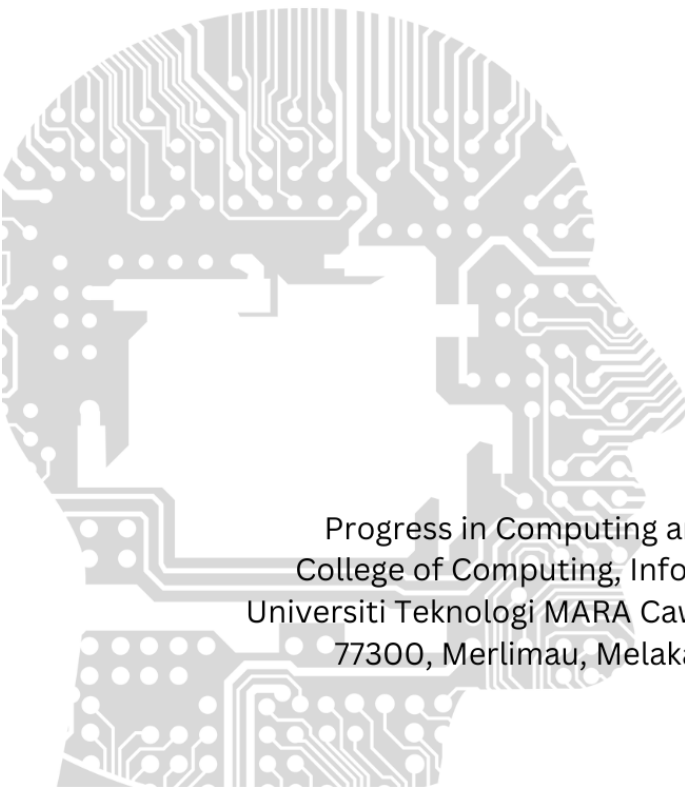
Cawangan Melaka

PCMJ

Progress in Computing and Mathematics Journal

volume 1

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Progress in Computing and Mathematics Journal
College of Computing, Informatics, and Mathematics
Universiti Teknologi MARA Cawangan Melaka, Kampus Jasin
77300, Merlimau, Melaka Bandaraya Bersejarah

PCMJ

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PCMJ

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volume 1

PREFACE

Welcome to the inaugural volume of the **Progress in Computing and Mathematics Journal (PCMJ)**, a publication proudly presented by the College of Computing, Informatics, and Mathematics at UiTM Cawangan Melaka.

This journal represents a significant step in our commitment to fostering a vibrant research culture, initially providing a crucial platform for our undergraduate students to showcase their intellectual curiosity, dedication to scholarly pursuit, and potential to contribute to the broader academic discourse in the fields of computing and mathematics. However, we envision PCMJ evolving into a beacon for researchers both nationally and internationally. We aspire to cultivate a space where groundbreaking research and innovative ideas converge, fostering collaboration and intellectual exchange among established scholars and emerging talents alike.

The manuscripts featured in this first volume, predominantly authored by our undergraduate students, are a testament to the hard work and dedication of these budding researchers, as well as the guidance and support provided by their faculty mentors. They cover a diverse range of topics, reflecting the breadth and depth of research interests within our college, and set the stage for the high-quality scholarship we aim to attract in future volumes.

As editors, we are honored to have played a role in bringing this journal to fruition. We extend our sincere gratitude to all the authors, reviewers, and members of the editorial board for their invaluable contributions. We also acknowledge the unwavering support of the college administration in making this initiative possible.

We hope that PCMJ will inspire future generations of students and researchers to embrace research and innovation, to push the boundaries of knowledge, and to make their mark on the world of computing and mathematics.

Editors

Progress in Computing and Mathematics Journal (PCMJ)
College of Computing, Informatics, and Mathematics
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LEARNING KEDAH'S DIALECT VIA GAME-BASED LEARNING

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Article Info

Abstract

Malaysia's rich cultural legacy is reflected in its diverse linguistic tapestry, where each state has its own distinct dialects and linguistic subtleties. The dialect spoken in Kedah stands out as one of the most interesting among them, capturing the unique sociocultural dynamics and historical influences of the area. The motivation to do this project is to solve the language barrier between Malaysians in this country. The principal aims of this study were to create a compelling 2D game interface, create a mobile application that facilitates learning the dialect of Kedah, and assess the app's usefulness in teaching basic dialectic information. The application of the ADDIE and ARCS Model, a well-established framework that emphasizes the significance of grabbing learners' attention, establishing the relevance of the content, fostering confidence in learners' abilities, and guaranteeing their overall satisfaction with the learning experience, is central to the design and evaluation of the game-based learning approach. The project assesses the game's usability using the System Usability Scale (SUS) questionnaire. With an evaluation score of 79.88%, the game received an outstanding SUS rating. The score is categorized as an excellent adjective rating based on the SUS score. The results of this study provide insightful information about how game-based approaches may be used to preserve and spread regional dialects. This study is a first step toward incorporating technologically advanced solutions for the preservation and advancement of linguistic diversity. In future endeavors, this game could be added with some features like the Google Translate, where users can sort in their sound and it would give out the meaning in their chosen language, integrating more interactive conversations scenarios within the game and expanding the cultural elements in the game would provide a more immersive experience

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INTRODUCTION

The government of Malaysia has been working to create a nation state and one of most important techniques in making it is by the use of only one language as the national language which is, 'Bahasa Melayu' (Mohamad Kamil & Mohamad, 2020). Dialect can be supposed as the input to the standard language. Even though its contribution is just slightly, the dialect present can be put as a significance in reinforcing the standard language in terms of the vocabulary and the terminology (Zubir et al., 2022). Based on (Mohd. Rashid Haji Md Idris et al., 2012), there are several Malay dialects that exist in the peninsular or Malaysia, including Kedah's dialect.

Based on Malaysia Dateline news (Wan Siti Aminah, 2023) a mother's heart shatters when her daughter, whom she sent to a primary school with high hopes, returns crying. Through an experience shared by a mother on her social media platform, TikTok, her daughter was ignored by her classmates due to poor knowledge of Malay Language. Due to the language barrier, the girl cannot get along with her peers. Besides that, based on Agenda Daily news, there was a misunderstanding between the 'Menteri Besar Kedah', Datuk Seri Muhammad Sanusi Md Nor towards his opponent during General Election 15 the other day.

From here, it shows how dangerous it is to not know other states' dialects and can lead to a huge misunderstanding like this. Unfortunately, there was not a lot of news or articles being voice out about this Kedah's dialect making the rate of extinction faster. Therefore, this project will develop a game-based learning in learning Malay dialects focusing on Kedah's dialect. This Kedah dialect with game-based learning is suitable for those who have learnt the standard Malay.

LITERATURE REVIEW

Malaysia is a multiracial society that gathers the Malays, Chinese, Indians, Kadazans, Ibans and other ethnic groups. The official language used in Malaysia is Malay, due to the contribution of its largest ethnic group in the country (Adelaar, 2004). This language has been the pillar of strength of Malaysia since it gives Malaysia a national identity. The

language has united all the ethnic and has strengthened the communicative integration (Edgar R. Eslit, 2012). Among all of these ethnic groups, all of them have their own dialects too.

This research is focusing on Malay ethnicity since it has the biggest majority in Malaysia. There are a few descendants of Malay. However, as the time passed, the dialect was threatened that it was not used as frequently as it had been used before. Realizing the importance of learning Malay Dialects, this research is done to let future generations still learn it before it becomes extinct. According to an article cited by (Mohd. Rashid Haji Md Idris et al., 2012), there are a few researches on the Malay Dialects done, but this research is not complete and they do not even produce a dialect dictionary that led to this research.

The Need of Digitization of Kedah's Dialect Book

Major obstacles to the preservation and spread of the Kedah dialect exist due to no internet resources for it. Even though it is valuable, printed books have a limited audience because they are not free. By changing the access and making it accessible online, younger generations and other audiences with greater propensity for technology would benefit. Online resources can also be expanded and updated often ensuring the dialect's changes are effectively recorded and transmitted.

The traditional methods for producing books have entailed either human or mechanical binding or paper sheets to create an organised, structured, composite entity. There are currently numerous alternative methods for producing books and distributing and also using them thanks to the new publication media. The most recent trend in the publishing industry is the development of electronic books (e-books) (Kozak, 2003). In addition, a lot of older books, some of which have lost their copyrights and are no longer in print, have been converted to digital format. In conclusion, Kedah's Dialect needs to be digitized because learners can just download e-books from the internet and read them on specialized gadgets.

Mobile Game-Based Learning

"Mobile Game-Based Learning (mBGL) is a game-based learning that utilizes mobile technologies such as mobile phone and handheld devices as the playing platform," (Zaibon & Shiratuddin, 2010). (N. Mohamudally, 2006) describes mobility, limitations on mobile technology and pedagogical theory that must be modified to ensure that technical capabilities

of current standard mobile phones are some of the worrying aspects of mGBL. According to a journal done by (Zaibon & Shiratuddin, 2010), mGBL applications are developed for a broad variety of learning contexts. Games are recognised for being powerful tools for inspiring people to play, connect, communicate and learn.

METHODOLOGY

This project uses the ADDIE method in making mobile game-based learning. ADDIE's method cycle. ADDIE has 5 stages which are Analysis, Design, Development, Implementation and Evaluation. This ADDIE model offers several advantages that can be beneficial for this project of teaching people Kedah's dialect through Game-Based Learning (GBL). Since the ADDIE model uses a structured approach, it provides a systematic and structured approach to instructional design. ADDIE helps in organizing this project. Moreover, ADDIE also ensures that all steps are taken into account.

ADDIE model promotes iterative development where the project can be continuously refined and can be improved. The evaluation phase of the ADDIE model is essential for determining the impact of the GBL project. Comments can be gained from students and evaluation can be done to know how well the learners are picking up Kedah's dialect. This can be used as the input to pinpoint the problem areas and develop well-informed plans for further game iterations and expansion.

Phases of ADDIE Methodology

The phases of ADDIE methodology are discussed in this section that consists of five stages; Analysis, Design, Development, Implementation, and Evaluation. Each of these phases has its own flow and process that enables this project to be developed smoothly. Figure 1 shows the ADDIE Model with five stages.

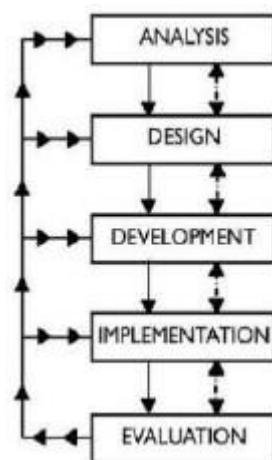


Figure 1: ADDIE Model
(Source: Ku et al., 2020)

Analysis Phase

In instructional design, the analysis phase is used to gather relevant data. In this context, the analysis phase of ADDIE methodology is crucial for gaining a deep understanding of the learning needs and requirements of the target audience. Finding the needs and limitations of the product is the procedure of the analysis phase. The target audience is determined in this step. As for this project, travellers are the intended audience. This project's goal is to make sure Kedah's dialect can survive the future and will not extinct because this Malaysia's dialect is a heritage and legacy of the ancestors.

In this phase, there were several activities done in order to achieve the deliverables. Firstly, data is collected to identify the specific language skills and knowledge required to learn the dialect. This activity is done through research on previous studies as in from the journal article and books, effectively creating a literature review. Besides, in this analysis phase, the target audience was set by research on articles and successfully produced the objectives, scope and significance. Lastly, in this analysis phase, problem statements were delivered successfully by distributing Google Form to thirty people.

Design Phase

To begin the Design phase, the learning objectives must be set, the analysis should be

conducted and selected the tools and resources to be used. By assessing the types of cognitive abilities needed to meet the teacher’s objectives, the most suitable mobile app setting must be chosen by evaluating the types of cognitive skills. Moreover, the training targets must be jotted down and the project’s overall approach must be decided. In this phase, flowchart and storyboard will be designed. The flowchart will be using Draw.io software. While for the storyboard, Canva application will be used. Figure 2 shows the detailed flowchart.

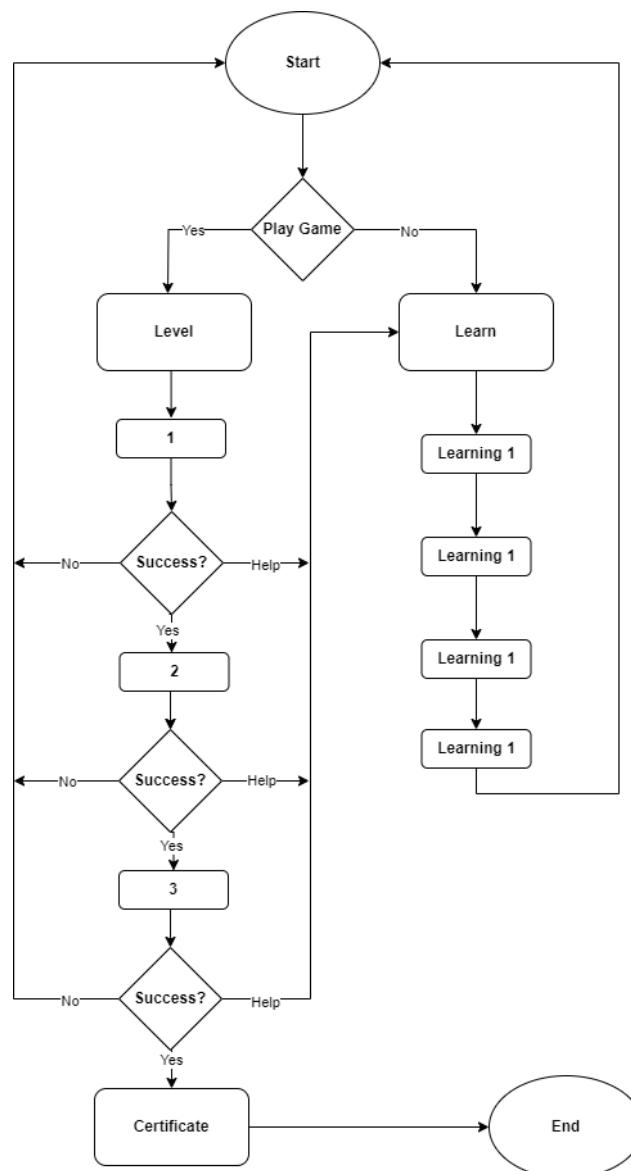


Figure 2 : Flowchart

A high-fidelity storyboard is a complex graphic representation of the major scenes and moments in a game, made up of illustrations and high-quality graphics that closely mimic the look and feel of the finished product. It offers a complex and well-executed graphic representation of the gameplay and user experience of the game, acting as a crucial roadmap for developers. High Fidelity Storyboard is shown in Figure 3.

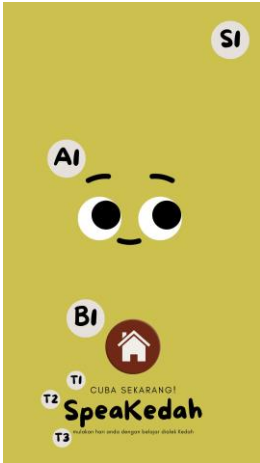
Scene 1 : Home Page

Description
<p>This page will appear once the learners open the app. To go to the Menu page, players need to click on the 'Home' button.</p>
Multimedia Elements:-
<p>T (Text), G (Graphic), A (Animation), S (Sound)</p>
<p>S1 : Background Sound A1 : Animation B1 : Home Button T1 : "CUBA SEKARANG" Text T2 : Application Name, "SpeaKedah" T3 : Text</p>


Figure 3 : High-Fidelity Storyboard

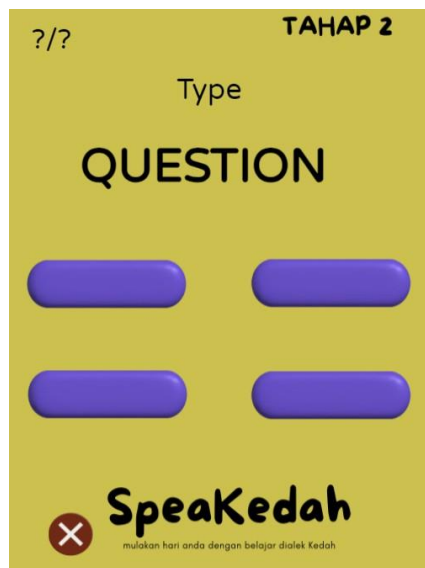
Development Phase

The process of development starts with production, formational evaluation and revision. The required media must be acquired or created during this process. The internet's capabilities must be used so that the project can meet the demands of students. In order to encourage students to continue their exploration of dialects, developers should be inventive and imaginative. In this GBL, suitable multimedia elements were produced from the design phase. All multimedia elements generated during this phase will be integrated as a prototype during the development phase.

In this stage too, everything from the design would be visible as a deliverable, allowing a non-designer to examine the results. During this development phase, each component of the course is created according to the design guidelines, which include the style guide, colors, fonts and graphics. Prototype helps in illustrating the concept. This enables obtaining client input and consent before continuing with a full development cycle. Table 1 presents the Final Version of the User Interface and its Description.

Table 1: User Interface Final Version

Interface	Description
	<p>Level 1: Learn the Pronunciation</p> <p>The primary goal of this level 1 is to introduce to players on how to pronounce the word while knowing the meaning. Players are required to drag and drop to the right word. The words give out the real pronunciation.</p>



Level 2 : Learn the Meaning of Kedah's Dialect Words

The primary goal of this level 2 is to test the user's attentiveness towards the learning page. Players are required to tap on the right button to answer it. Final score will be given at the end of level 2.



Level 3 : Learn to make a full sentence.

In this level, players are required to drag and drop the Malay language similar to the Kedah's dialect. The right drop will make the box turns blue while the wrong will turn into red.

Implementation Phase

In this stage, the environment that will be used to teach a course that was created will be used to teach a course that was created as a result of the previous phases will be prepared or set up. During this phase, teachers who are crucial to the delivery or user experience must also receive the essential training to use this learning Kedah's dialect application. Learners will start to notice the material in their learning environment during this period.

Evaluation Phase

The framework for continued implementation at all stages is the evaluation process. The test process will evaluate the usability of Kedah's dialect game lessons. So, throughout this whole process of instructional design, it should occur throughout each phase, in between phases and following implementation. In this phase, the activities are to assess the usability of the project, to analyze the learning outcomes and to identify the areas of improvement by doing System Usability Scale (SUS).

An evaluation on users' engagement in learning Kedah's dialect will be collected during this phase. The test will be conducted once the learner finishes the advanced level. This game evaluation test will be using a System Usability Scale (SUS). Based on (Aziz et al., 2022), one of the most outstanding methods to evaluate the usability of digital applications is the System Usability Scale (SUS) questionnaire. (Aziz et al., 2022) claimed that SUS is well-known as the standard for software because of its functionality, reliability, efficiency, maintainability and also portability. Thus, perceived usability is a crucial criteria for educational software like game-based learning since it has a significant impact on learners' total learning effectiveness. Table 2 shows the demographic participants information.

Table 2: Demographic of Participants

		Frequency	Percentage (%)
Gender	Male	12	40%
	Female	18	60%
Age	18 years old	6	20%
	19 years old	1	3.3%
	21 years old	1	3.3%
	22 years old	2	6.7%
	23 years old	13	43.3%
	24 years old	4	13.3%
	30 years old	1	3.3%
	47 years old	1	3.3%
	49 years old	1	3.3%

Usability Testing

This game uses usability testing of System Usability Scale to assess the Learning Kedah’s dialect game usefulness and user-friendliness. While completing procedures in order to find usability problems and obtain feedback, users need to engage with the game. User satisfaction and opinions of the game’s usability is measured by SUS questionnaire. This SUS questionnaire improves the game’s functionality and design. This strategy guarantees that the game effectively encourages the learning of the Kedah dialect. There are ten questions in total as shown in Table 3.

Table 3: System Usability Scale (SUS) Questionnaire

No.	Questions
1	I think that I would like to use this application frequently.
2	I found the application to be unnecessarily complex.
3	I think the application was easy to use.
4	I think that I would need the support of a technical person to be able to use this application.
5	I found the various functions in the application were well integrated.
6	I thought there was too much inconsistency in this application.
7	I imagine that most people would learn to use this application very quickly.
8	I found the application very awkward to use.
9	I felt very confident using the application.
10	I needed to learn a lot of things before I could get going with this application.

Table 4 shows the overall findings for each participant. The scores are gained from the SUS calculation and as a result, the average SUS score for the Kedah’s Dialect Game is 79.88%. Based on the final score of the SUS questionnaire, this score is classified as an average score.

Table 3: System Usability Scale (SUS) Questionnaire

Participants	Question										Final Score
	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q 10	
P1	5	2	5	2	5	1	5	2	5	2	75
P2	5	1	5	1	5	1	5	1	5	1	100
P3	4	4	4	4	4	1	4	1	4	4	34
P4	5	1	5	1	5	1	5	1	5	1	30
P5	5	1	5	1	5	1	5	1	5	1	100
P6	5	2	5	3	5	1	5	1	5	4	85

P7	5	1	5	1	5	1	5	1	5	1	100
P8	5	5	5	5	5	5	5	5	5	5	50
P9	5	1	5	1	4	2	5	1	5	1	75
P10	5	1	5	1	5	1	5	1	5	1	100
P11	3	3	3	3	3	3	3	3	3	3	50
P12	5	3	5	5	5	3	5	4	4	4	62.5
P13	5	1	5	1	5	1	5	1	5	1	100
P14	5	3	5	3	4	2	4	2	4	3	72.5
P15	5	5	5	5	5	5	5	5	5	5	50
P16	4	1	5	1	5	4	4	1	4	1	85
P17	5	2	5	1	5	2	5	1	5	1	95
P18	4	2	4	1	4	2	4	2	4	2	77.5
P19	5	1	5	1	5	1	5	1	5	1	100
P20	5	2	5	2	5	2	5	1	5	1	92.5
P21	4	2	4	2	4	3	4	3	4	2	70
P22	5	3	3	2	5	2	5	1	5	2	82.5
P23	3	1	5	1	5	1	5	1	5	1	95
P24	5	1	5	1	5	1	5	1	5	1	100
P25	5	5	5	5	4	4	5	5	5	5	50
P26	4	1	4	1	5	1	5	1	5	1	95
P27	4	2	3	3	4	2	4	2	4	2	70
P28	5	1	5	1	5	1	5	1	5	1	100
P29	5	1	5	1	5	1	5	1	5	1	100
P30	5	1	5	1	5	1	5	1	5	1	100

**Average
SUS
Score: 79.88%**

RESULT AND DISCUSSION

Based on the average SUS score, the Learning Kedah's Dialect game successfully got into a favorable degree of user satisfaction and usability as the game gained 79.88%. According to the SUS score, which is a number between 0 and 100, the game did well in terms of user experience and usability. A score of 79.88% is above the average indicating that the game project has proven that the game is user-friendly, intuitive and efficient in

teaching Kedah's Dialect. According to this score, the game's interface, interactions, and general usability were deemed satisfactory by most players.

CONCLUSION

This proposal embarked on the development of a 2D game for learning Kedah's Dialect, employing the systematic and structured ADDIE methodology. The development of this 2D mobile game has become a successful solution to overcome the language barrier between Malaysians. The primary objectives were to design an interactive 2D interface Kedah's dialect game-based learning, to develop a game-based learning app of Kedah's dialects and to evaluate the usability of basic Kedah's dialect offering a novel approach to Kedah's Dialect acquisition. By putting into practice the ARCS model, users of various ages have become effectively engaged by the game that guarantees that the dialect learning is catered to their individual needs and learning capacities. Through the lens of the System Usability Scale (SUS), the usability and user experience of the developed game were rigorously assessed.

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1

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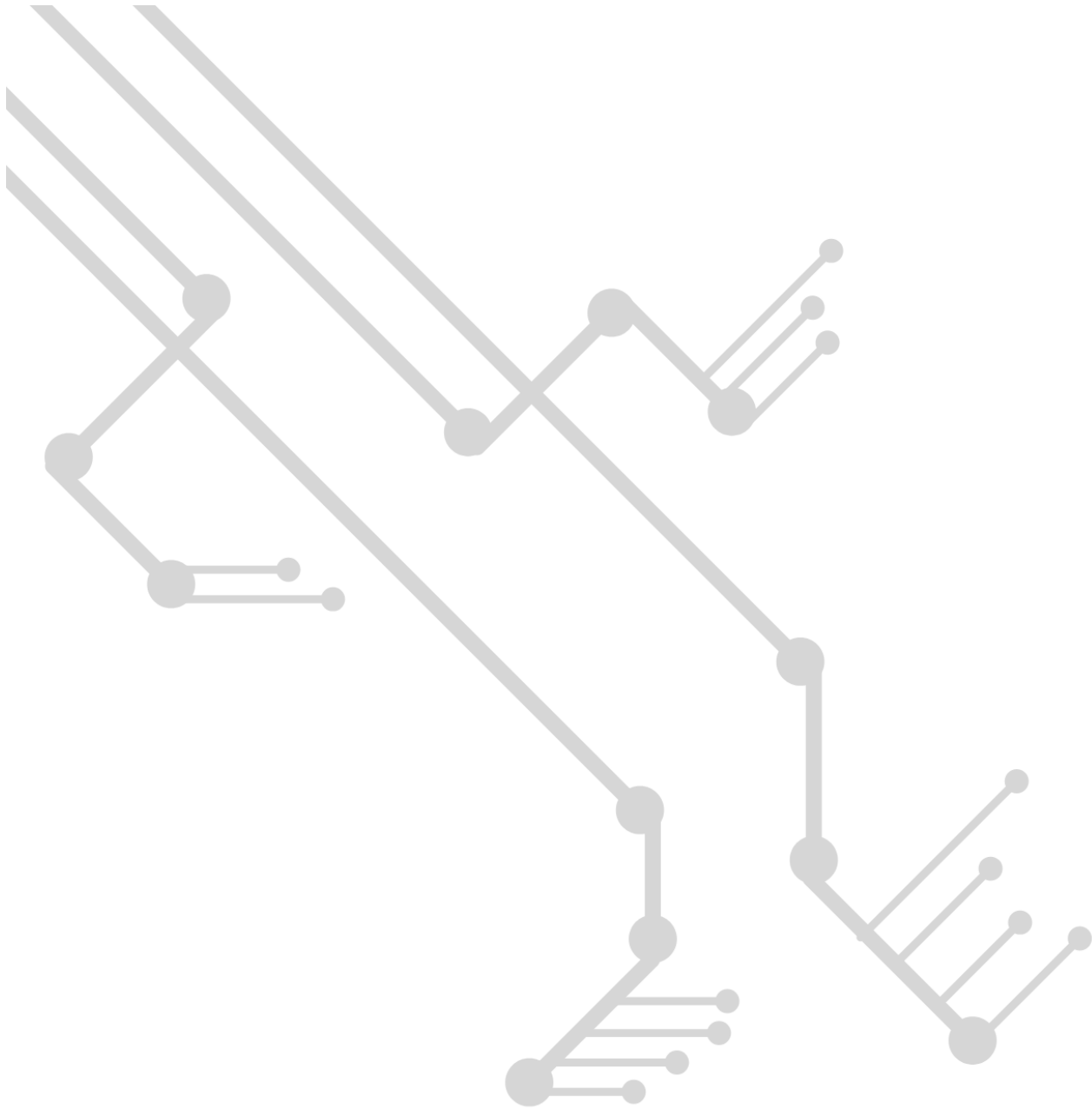
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