

UNIVERSITI TEKNOLOGI MARA

**CHECKMATE: A REAL-TIME
TRACKING SYSTEM USING FACE
RECOGNITION AND GEOFENCING**

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ABSTRACT

CheckMate is a mobile app aiming to revolutionise teacher attendance in schools, eliminating the cumbersome punch-card systems of the past, replacing them with face recognition and geofencing. The system promotes safe and accurate attendance marking by identifying who the user is and verifying their location in real-time. CheckMate was developed using the Extreme Programming (XP) methodology, which emphasises short iterations of development, frequent stakeholder feedback, and usability testing. The system incorporates a mobile interface for teachers focusing on drawing as little attention as possible to the attendance process; an analytical dashboard for staff and administrators; and extensive data logging for study record retention. Testing has shown consistent reliability, with 87.5% of users stating they had no issues in marking attendance and 100% geofencing fidelity. CheckMate also has the limitations of facial recognition being sensitive to lighting issues, however CheckMate provides a sustainable pathway to eliminating time-consuming administrative tasks and reducing fraud. Future advancements may include multi-platform support and analytic dashboards. The development of CheckMate and the potential it provides to the educational administration sector demonstrates the promise of developing biometric and location-based technologies.

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CHAPTER 1

INTRODUCTION

CheckMate was a mobile application that was built for attendance purposes. It focusses on School Teachers attendance environments. This will replace the traditional physical attendance system in the classroom, using a punching card principle. The application provides it with face recognition and geofencing for an improved attendance system. This will minimize fraudulent behavior and save time.

1.1 Background

In the current rapidly changing work environment, enterprises are always looking for the ways to advance their working process for the sake of efficiency and productivity. The methods used by businesses to track attendance have transformed significantly over the centuries, from traditional punch cards to advanced biometric time clock systems. This development has followed the trend of increasing the accuracy, efficiency, and security of methods doing attendance tracking.

Employee attendance tracking was first utilized in the early 19th century when companies used manual methods such as time clocks and paper registers to keep track of employees' working hours. Punching in" and "punching out" could be used by employees as a way of indicating time spent on the job, utilizing punch cards, first introduced at the end of the 19th century. Even though it established the framework for the systematic logging of attendance, this analogical method was limited by its tendency to make errors, buddy punching (when a