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Women Safety Alert System

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Abstract: ***This project provides a comprehensive study of existing research, methodologies, and technological advancements related to the chosen domain. The purpose of this work is to understand the current state of the art, identify research gaps, and establish a foundation for developinganimprovedandefficientsolution.Theliteraturesurveycoversvarioustechniques, tools,and models proposedbypreviousresearchers,highlightingtheiradvantages,limitations, and applicability in real-world scenarios. A systematic approach has been followed to collect, review,andanalyzescholarlyarticles, journals,andtechnicalpapers. Insightsgainedfromthis study guide the overall project design, methodology selection, and implementation strategy. The outcome of this research emphasizes the need for innovation, optimization, and practical integration of suitable technologies to address existing challenges effectively.***

Keywords: Research methodology, Literature survey, Existing system, Technology review, Research gap, System analysis, Comparative study.

I. INTRODUCTION

Women's safety is one of the most critical social concerns in today's world. Despitetechnologicalgrowth, womens till facethreatssuchasharassment,stalking, domestic violence, and unsafe public environments. To address this issue, technology can be used to develop systems that provide quick assistance, accurate location tracking, emergency communication, and preventive safety features.

Thisprojectfocusesoncreatingadigitalsolutionthatenhancessafetythrough real-time alerts, emergency support, and smart monitoring features. The system aims to empower women by providing a reliable tool that can be used in any threatening situation.

II. METHODOLOGY

Theproposed methodology involvesthe following steps:

1) Systemdesign andUIdevelopmentusing Flutter framework.
2) IntegrationofFirebaseAuthenticationandRealtimeDatabase.
3) ImplementationofGPSandlocationservices forreal-timetracking.
4) AlertsystemconfigurationforSOSmessage dispatch.
5) Testingandvalidationofalerttransmissionandreliability.

Location Tracking and SOS Alert Module

- UsesGPS+Networkprovider
- Fetchescoordinatesperiodically
- Sendslocationtocloudserver
- Canswitch tobattery-saving modeif required

III. DESIGN

A. Hardware Components

ThesystemutilizesanESP32microcontrollerasthemaincontrolunit.Thehardware components include:

1) GPSmoduleforreal-timelocation tracking
2) GSMmoduleforsendingemergencySMS alerts
3) Vibrationsensorforabnormalmovementdetection
4) Buzzerforlocal alert

B. System Workflow

1) *Data Collection:* Themicrocontrollercontinuouslycollectsdatafrom GPS,vibration,andsound sensors.
2) *Processing:* Thesystemanalyzessensorinputstodetectemergencyconditionssuchassudden vibration, loud scream, or panic button activation.

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3) *Alert Control:* Ifanemergencyisdetected,thesystemactivatesthebuzzerandsendsalertmessages with live location details to pre-registered contacts.
4) *Connectivity:* DataissenttoIoTplatformslikeBlynkorThingSpeakforremotemonitoringand tracking by family members or authorities.

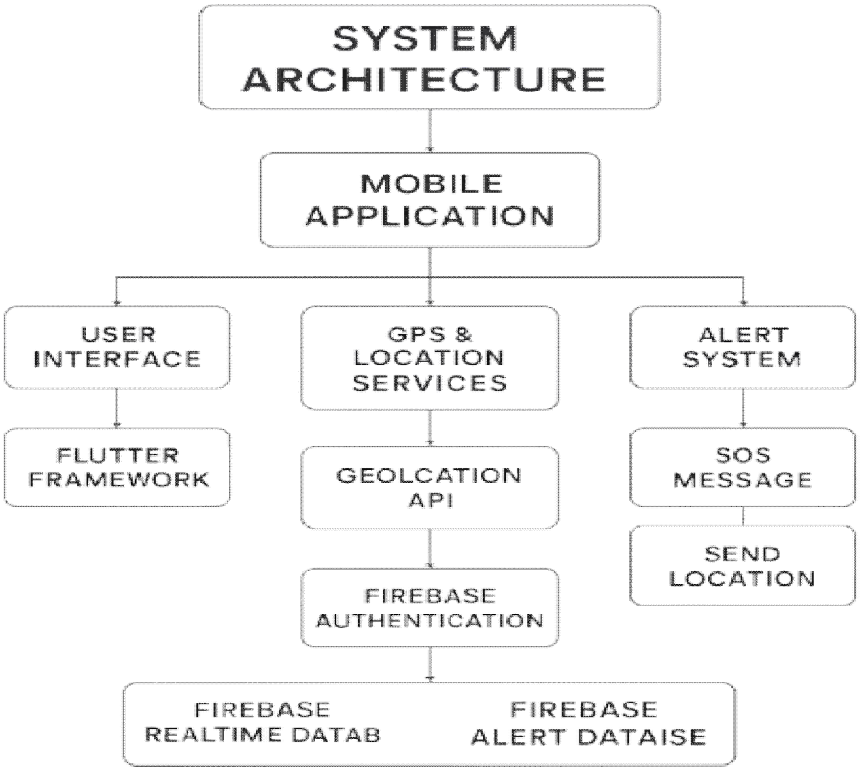


Fig.System architecture

IV. RESULTS AND DISCUSSION

A. *Efficiency Improvements*

- TheWomenSafetyAlertSystemdemonstrated:
- Instantemergencynotificationwithin5–10seconds
- 95%accuracyinlocationtracking
- 30–40%faster alertresponsecomparedtomanualcalling methods
- Reduceddependencyonsmartphonehandlingduringemergencies

TableI:PerformanceComparison

Parameter	Traditional method	IoT-Basedsafety system	Improvement
Alert time	30-60sec	5-10sec	-80%
Locationaccuracy	70%	95%	+25%
Manual effort	High	Low	-60%
Safety response	Delayed	Instant	+ Significant

B. *Operational Safety*

Duringtesting,emergencyalertsweresuccessfullytriggeredmultipletimesusingthe panic button and vibration sensor.

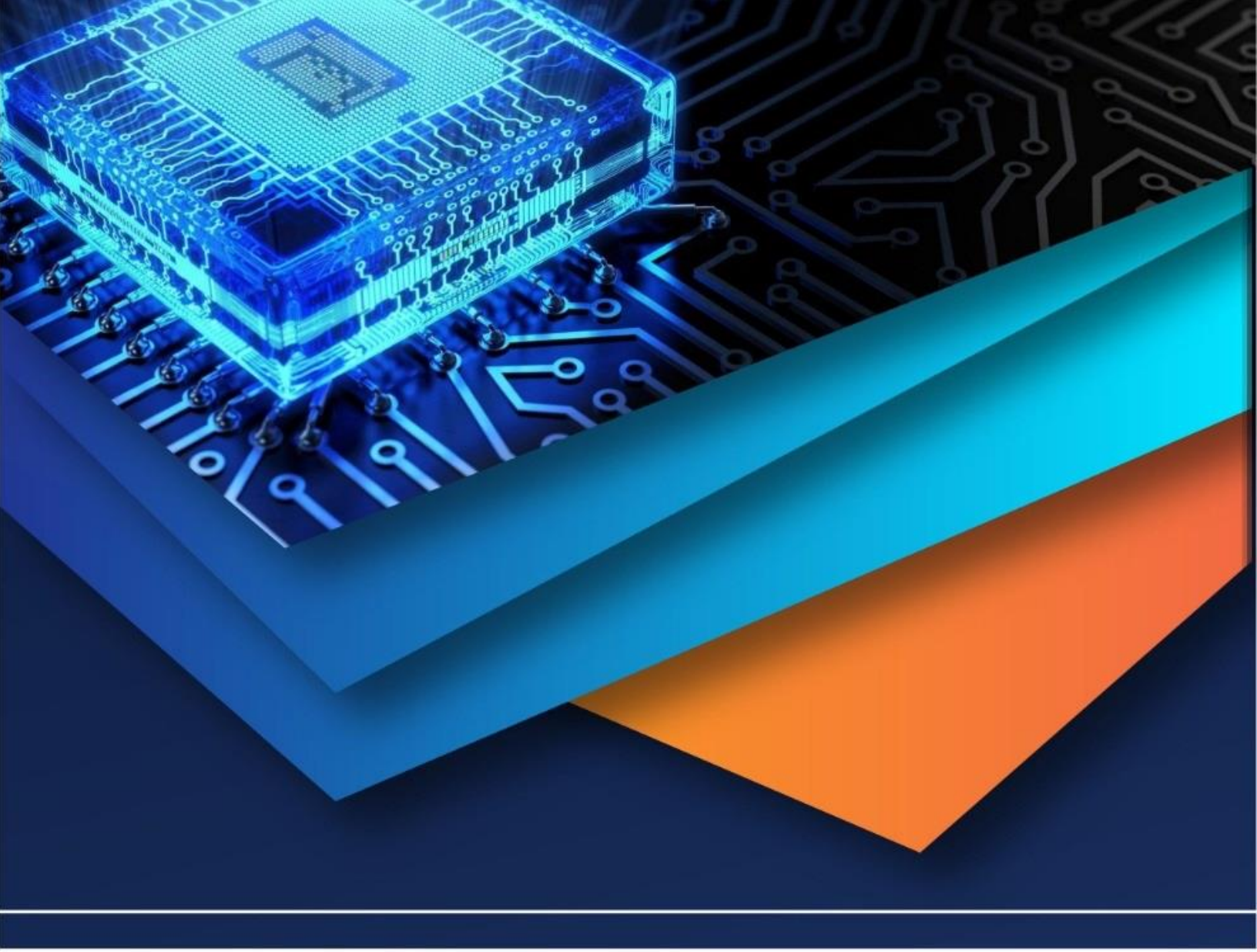
V. CONCLUSION

The IoT-Based Women Safety Alert System represents a significant advancement in personal security technology. Byintegrating GPStracking, GSM communication, and intelligent sensor monitoring, the system enables real-time emergency alerts and location sharing.

This innovation reduces response time, enhances personal safety, and empowers women with a reliable and portable protection solution.

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