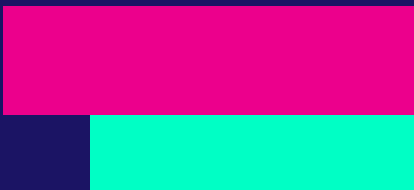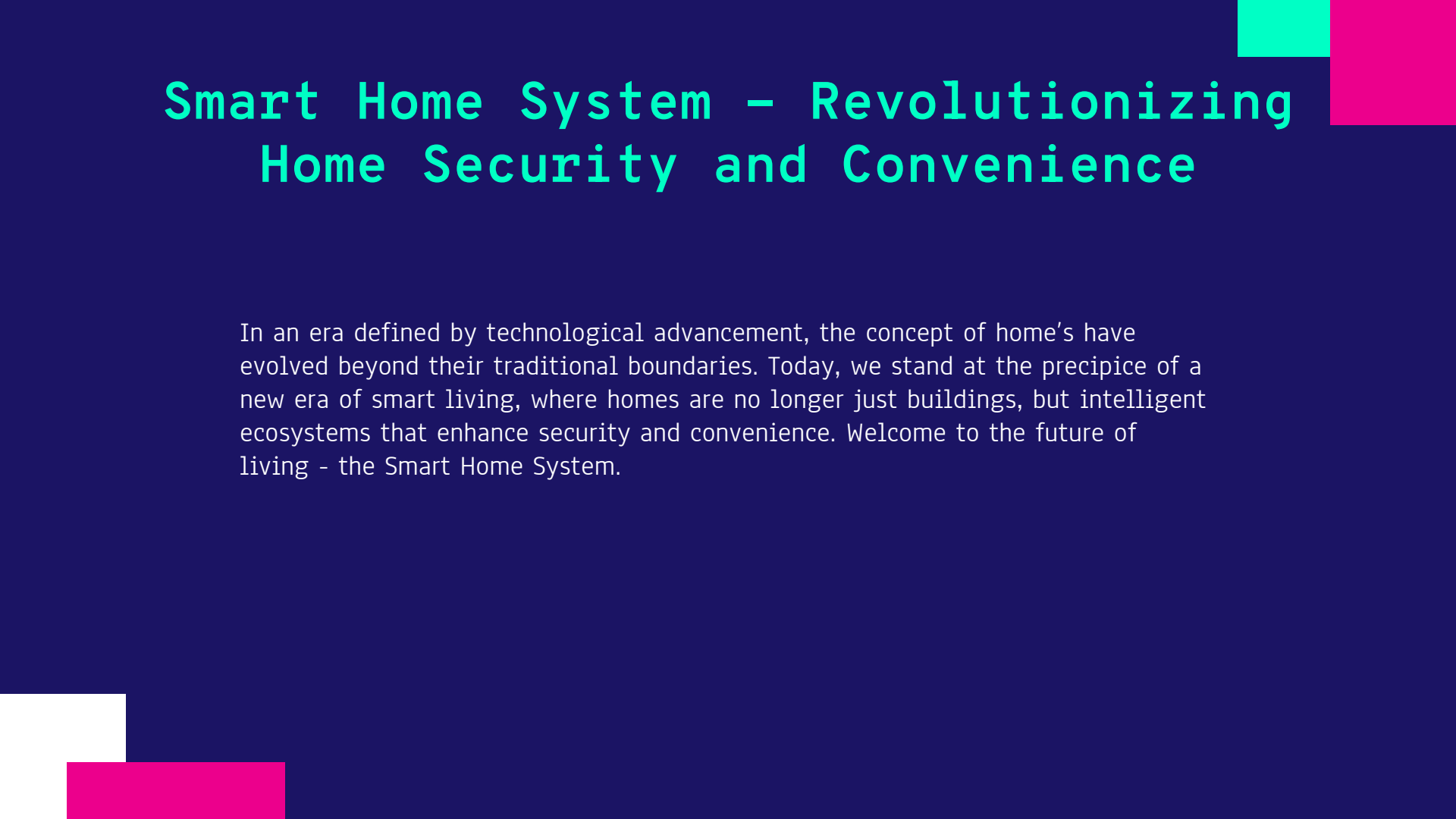# Smart Home System

By: Asfandiyar, Vaishnavi, Vivien, Isha, Vy, Erica

Smart Home System – Revolutionizing Home Security and Convenience

In an era defined by technological advancement, the concept of home's have evolved beyond their traditional boundaries.

Today, we stand at the precipice of a new era of smart living, where homes are no longer just buildings, but intelligent ecosystems that enhance security and convenience.

Welcome to the future of living - the Smart Home System.

The Domain – Smart Home Technology

- The realm of smart home technology is a captivating intersection of innovation, convenience, and security.
- It encompasses a wide range of interconnected devices and systems designed to make our lives easier and safer.
- At its core, this technology empowers us to control and monitor various aspects of our homes remotely.

The Necessity – Why Smart Homes?

- Security: With rising concerns about home security, a Smart Home System provides advanced intrusion detection and access control, using cutting-edge technologies such as cameras, sensors, RFID tags, and more.
- Convenience: Imagine a home that adapts to your preferences, turning on lights, adjusting the thermostat, and even brewing your morning coffee as you wake up - all automatically.
- Energy Efficiency: Smart homes optimize energy consumption, reducing your carbon footprint and saving money on utility bills.

Functional Key Features - Making Life Smarter

Access Control

Know who enters your home and when

Remote Controller

Manage your smart home from your smartphone

Lock Control

Secure entry points to your home

"Live-in-look" Control

Timers to control lights, A/C, TV, sound, etc.

More Key Features – Making Life Smarter
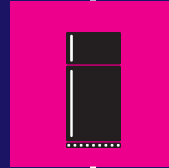
Status Report
Get real-time updates on your home's security and status

Voice Control
Voice assistant integration for hands-free control

Smart Appliances
Control smart appliances for added convenience

Water Leak Detection
Sensors that detect water leaks. Shut off water to prevent damage

More Key Features – Making Life Smarter

Geofencing

Based on the user's location the system should be able to disarm and arm accordingly
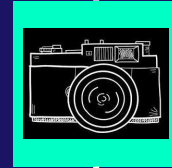
Event Logging

There should be a log of all security events including past alerts, system status (arming and disarming of system)

User Authentication

Users who are utilizing the system to change specific settings or controls should be password protected

Surveillance

Users can see footage of different areas of their property with streaming and playback

More Key Features — Making Life Smarter

Energy Efficiency

Incorporate smart thermostats and other energy systems to help user optimize their home's energy usage
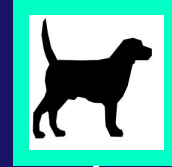
Personalized Profiles

Have the ability to create different profiles if there are multiple users so they can control the features according to their own preferences

Emergency Response

In the case of a fire or any emergency, be able to find the local emergency service and alert it automatically
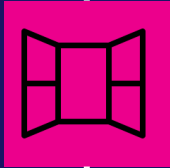
Pet Monitoring System

Be able to monitor pets by providing cameras, allow users to adjust the temperature, alert about unusual behavior

More Key Features - Making Life Smarter

Window Blinds and Shades Control

Automated control of window blinds based on weather conditions and user preferences

Automated Garage Door Control

Allow users to open, close, and monitor their garage doors remotely and be notified if so

Outside/yard light sensors

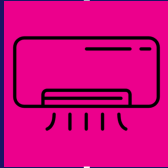Automatic lights outside the home that will turn on when sensing motion

Smart Gardening

Automation outdoor irrigation systems and make use of climate control situations
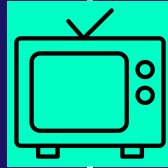
More Key Features — Making Life Smarter

Smart Heating and Cooling

Automated temperature control and monitoring based off the user's preference
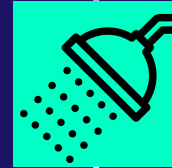
Audio Visual Systems

Connect in-home entertainment and sound systems to the smart home system

Digital Assistant

Interactable digital assistant that can answer questions, set reminders, and organize a calendar
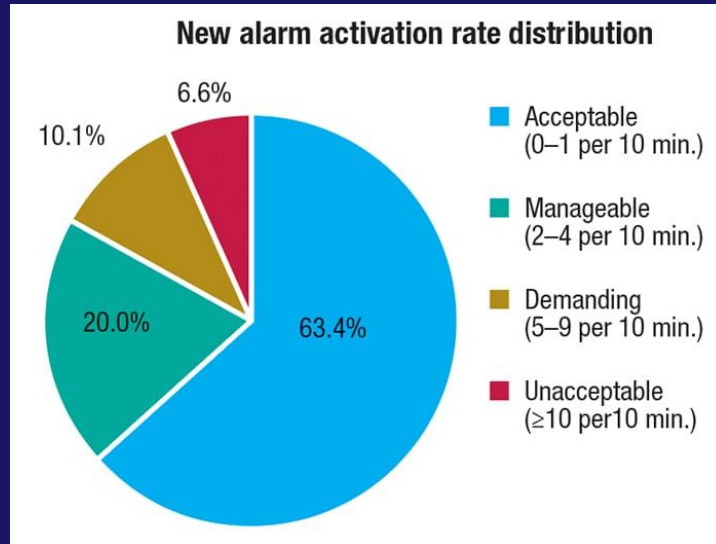
Smart Bathroom

Users can control showers/baths with preset settings for a personalized experience

Non-functional requirement:

Performance - Related to Response Time
- The system should state what the maximum response time is for alarm activation and other server requests.

New alarm activation rate distribution

6.6%
10.1%
20.0%
63.4%

Acceptable (0–1 per 10 min.)
Manageable (2–4 per 10 min.)
Demanding (5–9 per 10 min.)
Unacceptable (≥10 per10 min.)

Non-functional requirements:

Security and Encryption standards
- The system should state what the maximum response time is for alarm activation and other secure server requests.

Non-functional requirement:

System updates
- There should be a simple way to update the system and maintain the usability of the system so that there is long-term sustainability.
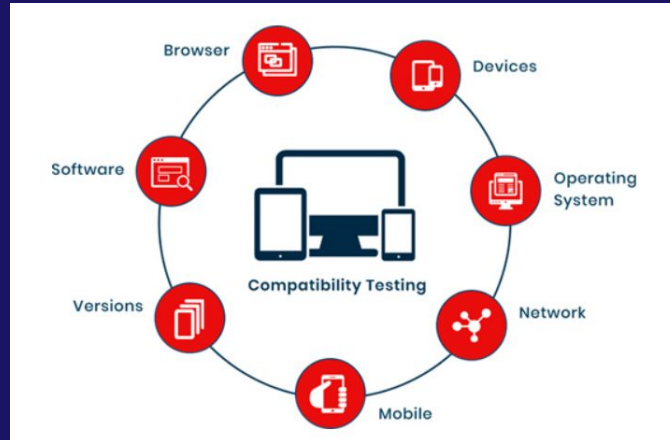
Non-functional requirement:

Reliability
- Making sure the functions of the house work consistently with few errors.

Non-functional requirement:

Compatibility
- The application must be compatible with the latest versions of web browsers, IOS software, and Android software.

Non-functional requirement:

Accessibility
- The UI should follow the Web Content Accessibility Guidelines so that the application is usable by people with disabilities.

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Potential Challenges

- Many preventative measures to consider for security and privacy for users
- Understanding how to connect the system in a user's home to our server
- Integrating various smart devices and ensuring there is compatibility with multiple devices that have different manufacturers will prove difficult.
- Handling large amounts of data generated by smart devices and appliances might bear too much strain on our server.
- Overall complexity related to a system that communicates with a wide range of other technologies.

Potential Strategies

Security & Privacy Measures:
- Implement strong authentication methods such as multi-factor authentication
- Utilize end-to-end encryption
- Run penetration testing to find system vulnerabilities

Device Integration/Compatibility:
- Use common IoT (Internet of things: network of physical devices embedded with sensors, software, etc.) standards such as Bluetooth, Wifi, Cellular, MQTT (MQTT is a language used by computers to transmit messages about your devices), etc.

Data Handling:
- Use cloud based solutions for data storage and minimize storage of unnecessary data.

Understanding the Complexity of the Domain:
- Maintain extensive documentation and break the system down into smaller, more well-defined components.

Questions?