Top Dog Technologies
Territory Tracking and Restriction System

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Contents

- Problem and Goal
- Problem Research
- Design
- Analyze Design
- Project Management
Problem Background

- Track and control pet whereabouts when humans are absent
- Protecting indoor furniture and belongings
Needs Statement

There is a need to have a pet deterrent system that tracks pet movement throughout the house 24/7 by monitoring and documenting when a pet enters off-limit areas and deters the pet when needed.
Goal

Create a network of receivers and transmitters that can record the general location of a pet and deter it from the off-limit areas.
Objectives

- The system must cost less than $500 to be competitively priced based on the quality level it provides to the consumer.
- The system must use a power source accessible to the public, such as a battery, and the power source must last at least 1 month without being replaced.
- The system must not harm animals or people.
- The system must function well in a typical indoor environment.
Objectives

- The collars should be light, less than 1 pound, and comfortable for the pet.
- The system must be easy for the user to set up which is defined as the set up time taking less than 30 minutes.
- The system must be easy to use and adjust, any adult with basic computer knowledge should be efficient with the system after 1 week.
Objectives

- The system should have a variable range that covers an area with a 3 foot radius to an area with a 20 foot radius.
- The system should document the zone and time when a pet violates a restricted location.
- The recorded information should be displayed to the user in an organized and understandable fashion.
Literature Review

- Indoor Positioning Systems
- PetSafe Electronic Indoor Pet Deterrent Systems
- Spring 2007 Pet Deterrent Project
- Contech ScatMat
- Range Modification for RFID Systems
Design Constraints and Feasibility

- System cost
- Available power source
- Power source cost
- Hindrance caused by collars
- Easy to set up, use and adjust
- Safety
- Functions in indoor environment
Alternative Solutions

- Triangulation based on UWB technology
- Triangulation based on RF technology
- Triangulation based on RF, GPS and Ultrasonic technology
- Landmark system design
- Pet position determined by passive RFID
Proposed Design

- Transmitters with variable ranges and unique IDs placed to create circular zones
- Collar contains receiver and PIC that records, and deters if needed, when pet enters a zone
- Information from collar can be transferred to computer via USB
- Software suite displays information and adjusts zone names and deterrent options
Proposed Design
Design Validation Approach

- Test at various stages of development
- Test transmitter and receiver for range and reliability in an indoor environment
- Test the battery power after usage
- Test the information being uploaded to the computer for accuracy
- Test the software
- Test that the product is easy to set up, use and adjust
Economic Analysis and Budget

- The cost must be kept to a minimum to keep the product competitive on the market

- Budget:
  - (4) Ti TRF7960 Transceivers: 4x4.86
  - (2) Pet Collar: 2x3.00
  - PIC18F2455 Microcontroller: 2x7.90
  - Project Enclosures: 2x2.79 (Total: 46.82)

*Budget does not include undetermined costs of various components*
## Task Schedule

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Project Management

- Michael: Team Leader, Head of Finances and Purchases
- Chris: Head of Software Design, Head of Technical Reports
- John: Head of Systems Design, Head of Documentation
- Denise: Head of Hardware Design,
Teamwork

- Individual progress recorded in journals
- Semiweekly meetings to discuss progress and plan next step
- Meetings include holding members accountable and team bonding
- Brainstorming sessions occur during and outside of meetings
- Open communication during meetings and through email
Societal, Safety and Environmental Analysis

- **Society Analysis:**
  - Product is used by choice
  - Product can make life easier

- **Safety Analysis:**
  - This project is not focusing on the deterrent method
  - Our project follows safety guidelines for RF technology and power supplies
  - Size and weight of collar must not hinder pet

- **Environmental Analysis:**
  - Projects frequency will not interfere with off limit ranges
Overview

- Problem and Goal
- Problem Research
- Design
- Analyze Design
- Project Management
Any Questions?