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Smart Desktop Plant Watering System

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Abstract

English

Design and develop a smart desktop plant watering and monitoring system to provide ideal growing conditions for a few pot plants. The system must be able to measure soil moisture levels and include a watering system to every appropriate plant as needed. The real-time system information must be able to be observed via an app or website, with accompanying historical data. The watering system must be able to be remotely accessed through the app. A camera must be included in the watering system, having view of all the plants, and should store the historical photos to create a timelapse. Periodical photos can be accessed on the app.

Afrikaans

Ontwerp en ontwikkel ’n slim water- en moniteringstelsel vir tafelplante om ideale groei toestande vir ’n paar potplante te bied. Die stelsel moet grondvogvlakke kan meet en ’n besproeiingstelsel by elke toepaslike plant insluit, indien nodig. Die intydse stelsel inligting moet waargeneem kan word via ’n toep of webwerf, met gepaardgaande historiese data. Die waterstelsel moet op afstand via die app beheer kan word. ’n Kamera moet in die besproeiingstelsel ingesluit word, met uitsig op al die plante, en moet die historiese foto’s stoor om ’n tydsverloop te skep. Periodiese foto’s kan op die app verkry word.

Contents

List of Figures

List of Tables

Nomenclature

Variables and functions

$p(x)$	Probability density function with respect to variable x.
$P(A)$	Probability of event A occurring.
ε	The Bayes error.
ε_u	The Bhattacharyya bound.
B	The Bhattacharyya distance.
s	An HMM state. A subscript is used to refer to a particular state, e.g. s_i refers to the i^{th} state of an HMM.
$\mathbf{S}$	A set of HMM states.
$\mathbf{F}$	A set of frames.
$\mathbf{o}_f$	Observation (feature) vector associated with frame f.
$\gamma_s(\mathbf{o}_f)$	A posteriori probability of the observation vector $\mathbf{o}_f$ being generated by HMM state s.
μ	Statistical mean vector.
Σ	Statistical covariance matrix.
$L(\mathbf{S})$	Log likelihood of the set of HMM states $\mathbf{S}$ generating the training set observation vectors assigned to the states in that set.
$\mathcal{N}(\mathbf{x}\|\mu, \Sigma)$	Multivariate Gaussian PDF with mean μ and covariance matrix Σ.
a_{ij}	The probability of a transition from HMM state s_i to state s_j.
N	Total number of frames or number of tokens, depending on the context.
D	Number of deletion errors.
I	Number of insertion errors.
S	Number of substitution errors.

Acronyms and abbreviations

AE	Afrikaans English
AID	accent identification
ASR	automatic speech recognition
AST	African Speech Technology
CE	Cape Flats English
DCD	dialect-context-dependent
DNN	deep neural network
G2P	grapheme-to-phoneme
GMM	Gaussian mixture model
HMM	hidden Markov model
HTK	Hidden Markov Model Toolkit
IE	Indian South African English
IPA	International Phonetic Alphabet
LM	language model
LMS	language model scaling factor
MFCC	Mel-frequency cepstral coefficient
MLLR	maximum likelihood linear regression
OOV	out-of-vocabulary
PD	pronunciation dictionary
PDF	probability density function
SAE	South African English
SAMPA	Speech Assessment Methods Phonetic Alphabet

Chapter 1

Introduction

In today's world, everything can be found on the internet and IoT is the newest buzzword. It aims to make our lives easier, to have everything at our fingertips Especially in South Africa, this technology is largly focused on home devices.

A new addition to the household IoT selection is smart monitoring systems for houshold plants, allowing your home te become a green jungle controlled via your phone.

1.1. Background

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1.2. Problem Statement

1.3. Project Objective

1.4. Overview

1.5. Layout

Chapter 2

Literature review

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Chapter 3

Summary and Conclusion

Bibliography

Appendix A

Project Planning Schedule

This is an appendix.

Appendix B

Outcomes Compliance

This is another appendix.