



Feature Selection using Dynamic Binary Particle Swarm Optimization for Arabian Horse Identification System

Presented by: Samar Ibrahim Youssef

MSc Student , Information Technology Department,
Faculty of Computers and Information,
Cairo University

Scientific Research Group in Egypt



27/12/2017

Annual Conference of the Institute of Studies and Statistical Research 2017
Workshop in Intelligent Systems and Applications

Outline

- **Introduction.**
- **Problem Statement.**
- **Proposed Methodology:**
 - ❑ **Phase I** : Pre-processing.
 - ❑ **Phase II** : Segmentation.
 - ❑ **Phase III** : Feature Extraction.
 - ❑ **Phase IV** : Feature Selection.
- **Conclusions & Future Work.**



Outline

- **Introduction.**
- **Problem Statement.**
- **Proposed Methodology:**
 - ❑ **Phase I** : Pre-processing.
 - ❑ **Phase II** : Segmentation.
 - ❑ **Phase III** : Feature Extraction.
 - ❑ **Phase IV** : Feature Selection.
- **Conclusions & Future Work.**



Introduction

□ Need for Arabian Horse Identification

- Biosecurity.
- Retrieval after theft.
- Fairness in competition.
- Medical record management.



Outline

- **Introduction.**
- **Problem Statement.**
- **Proposed Methodology:**
 - ❑ **Phase I** : Pre-processing.
 - ❑ **Phase II** : Segmentation.
 - ❑ **Phase III** : Feature Extraction.
 - ❑ **Phase IV** : Feature Selection.
- **Conclusions & Future Work.**



Problem Statement

Traditional Identification Methods



Tattooing



Ear Tagging



Branding

Problem Statement

Using Biometric identifiers (contactless methods) for identification and getting rid of **harmful** identification methods .

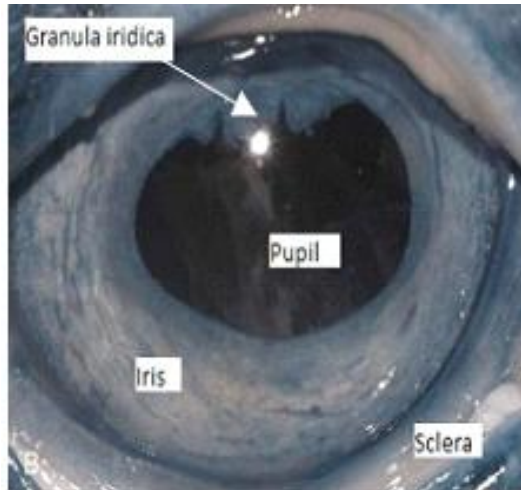


Muzzle Print

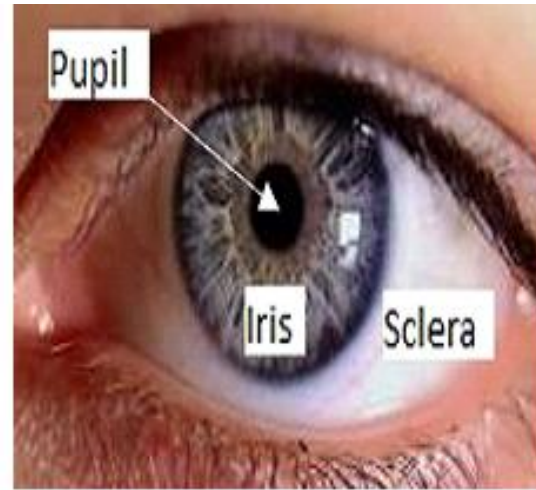


IRIS

Problem Statement



(a) Horse iris



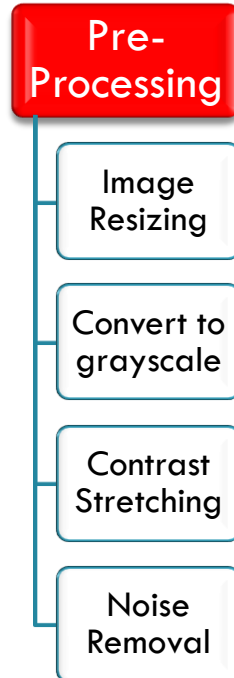
(b) Human iris

Outline

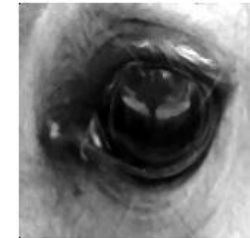
- **Introduction.**
- **Problem Statement.**
- **Proposed Methodology:**
 - ❑ **Phase I** : Pre-processing.
 - ❑ **Phase II** : Segmentation.
 - ❑ **Phase III** : Feature Extraction.
 - ❑ **Phase IV** : Feature Selection.
- **Conclusions & Future Work.**



Phase I: Pre-processing



Input Image



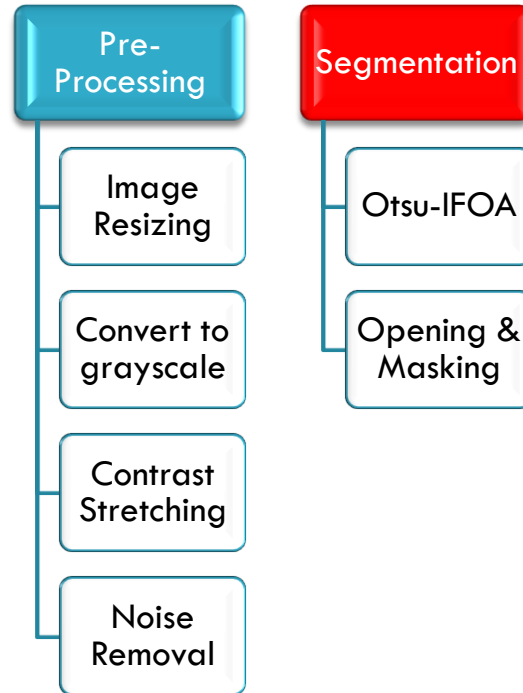
Processed Image

Outline

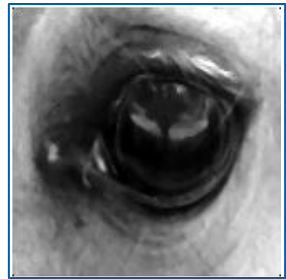
- **Introduction.**
- **Problem Statement.**
- **Proposed Methodology:**
 - ❑ **Phase I** : Pre-processing.
 - ❑ **Phase II** : Segmentation.
 - ❑ **Phase III** : Feature Extraction.
 - ❑ **Phase IV** : Feature Selection.
- **Conclusions & Future Work.**



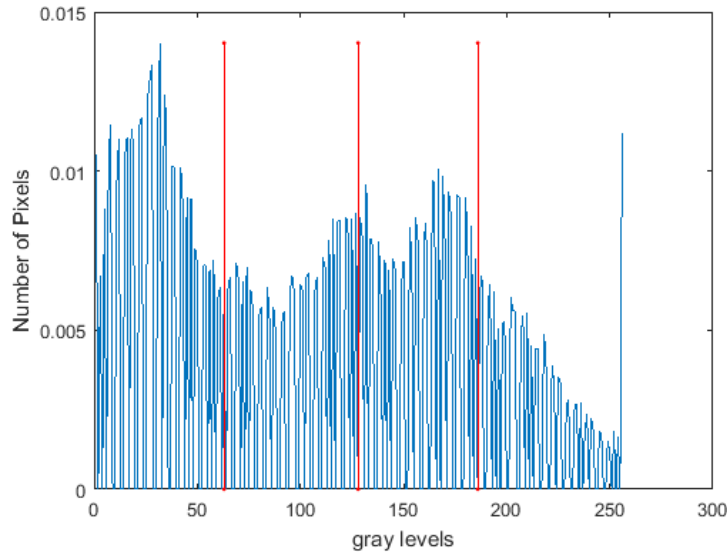
Phase II : Segmentation



Phase II: Segmentation(continued)



Processed Image



Thresholded Image

Binary Mask

Segmented Area

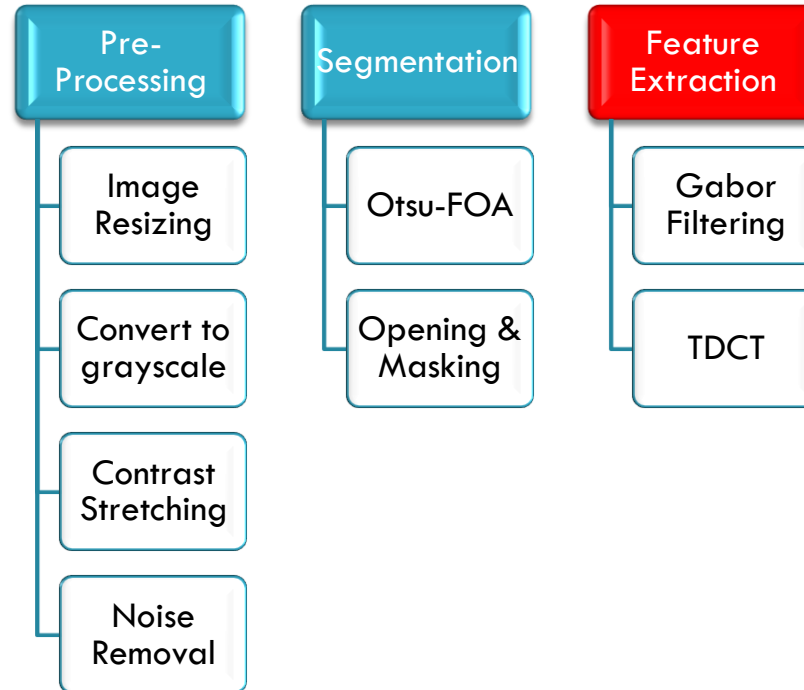
Otsu-IFOA Segmentation

Outline

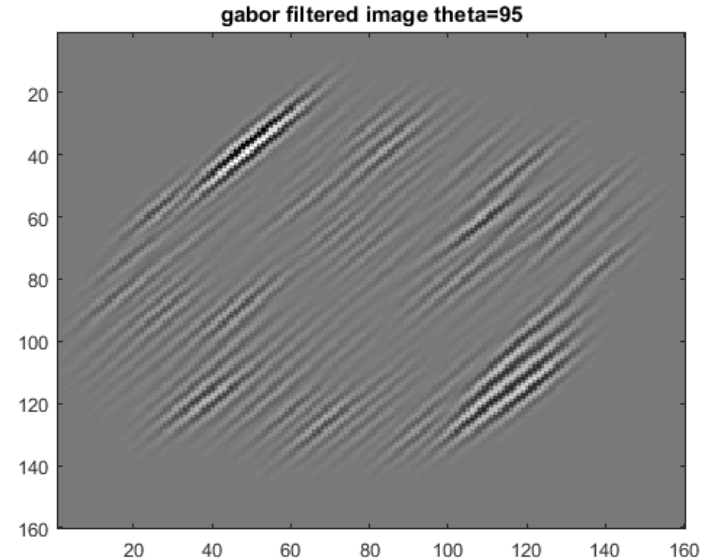
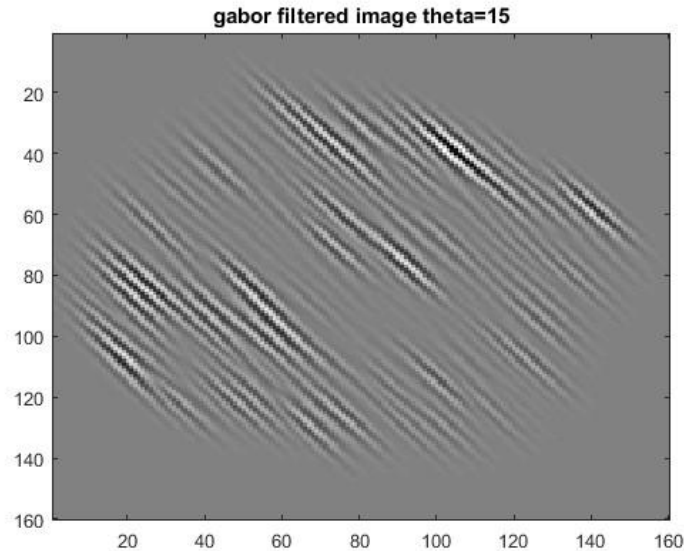
- **Introduction.**
- **Problem Statement.**
- **Proposed Methodology:**
 - ❑ **Phase I** : Pre-processing.
 - ❑ **Phase II** : Segmentation.
 - ❑ **Phase III** : Feature Extraction.
 - ❑ **Phase IV** : Feature Selection.
- **Conclusions & Future Work.**



Phase III: Feature Extraction

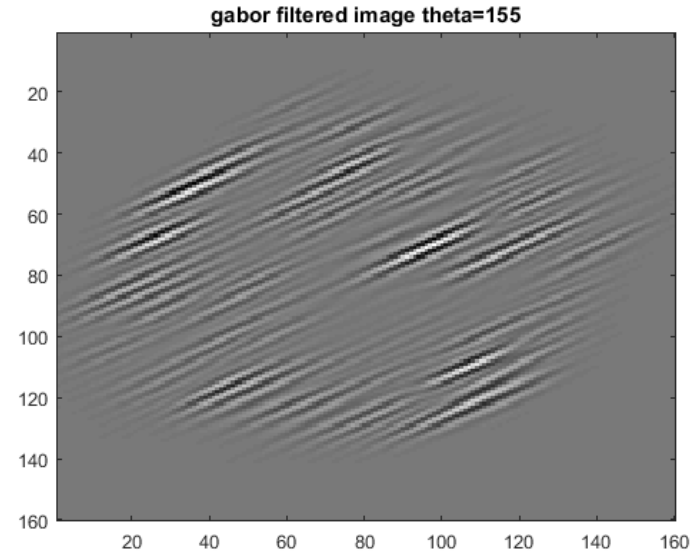
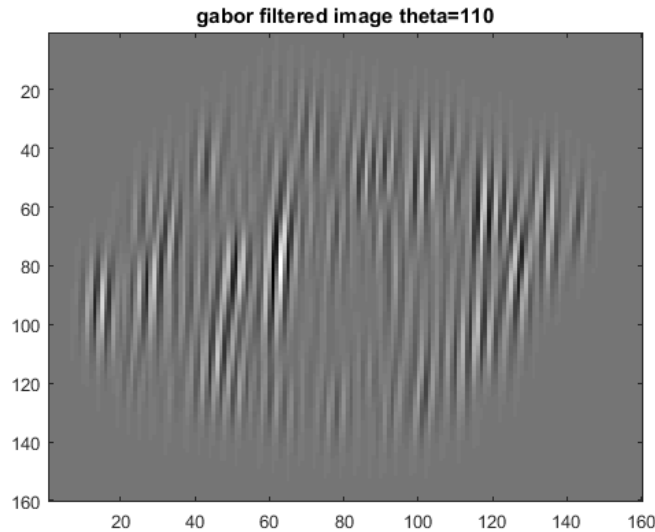


Phase III :Feature Extraction



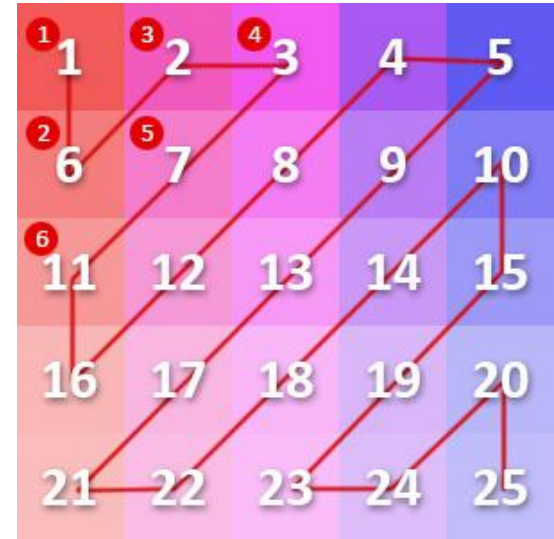
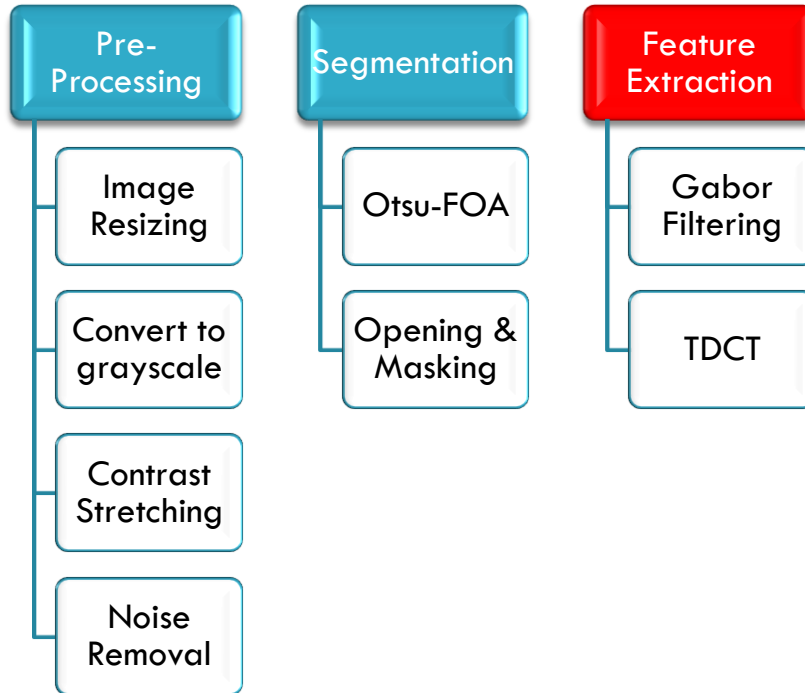
(Gabor Filtering)

Phase III :Feature Extraction

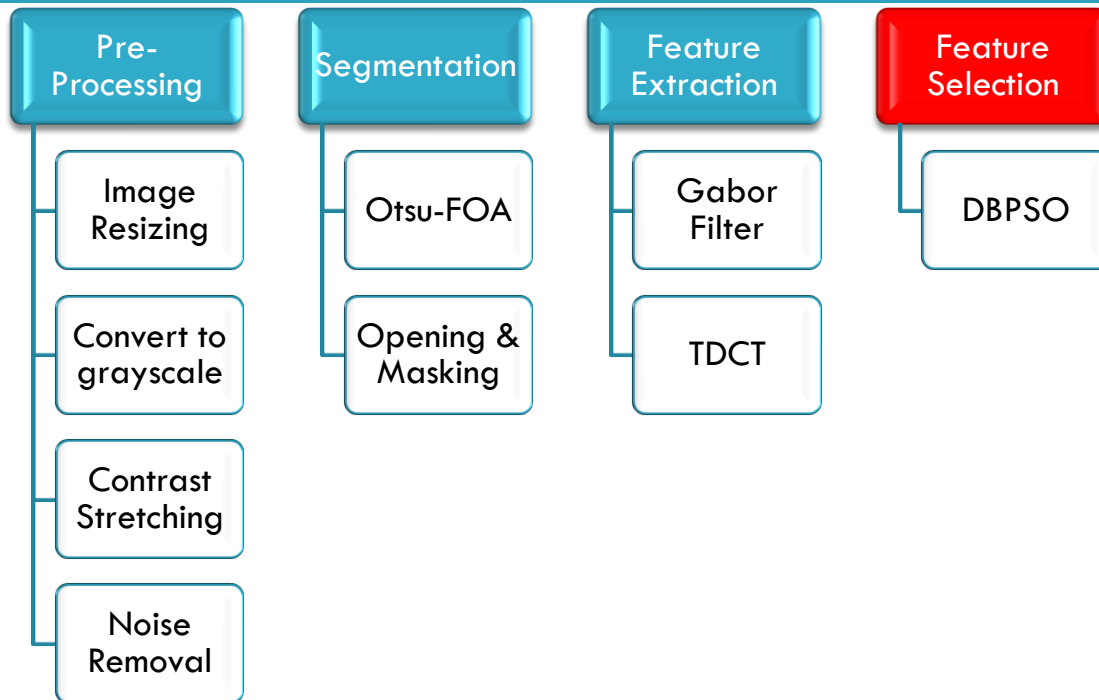


(Gabor Filtering)

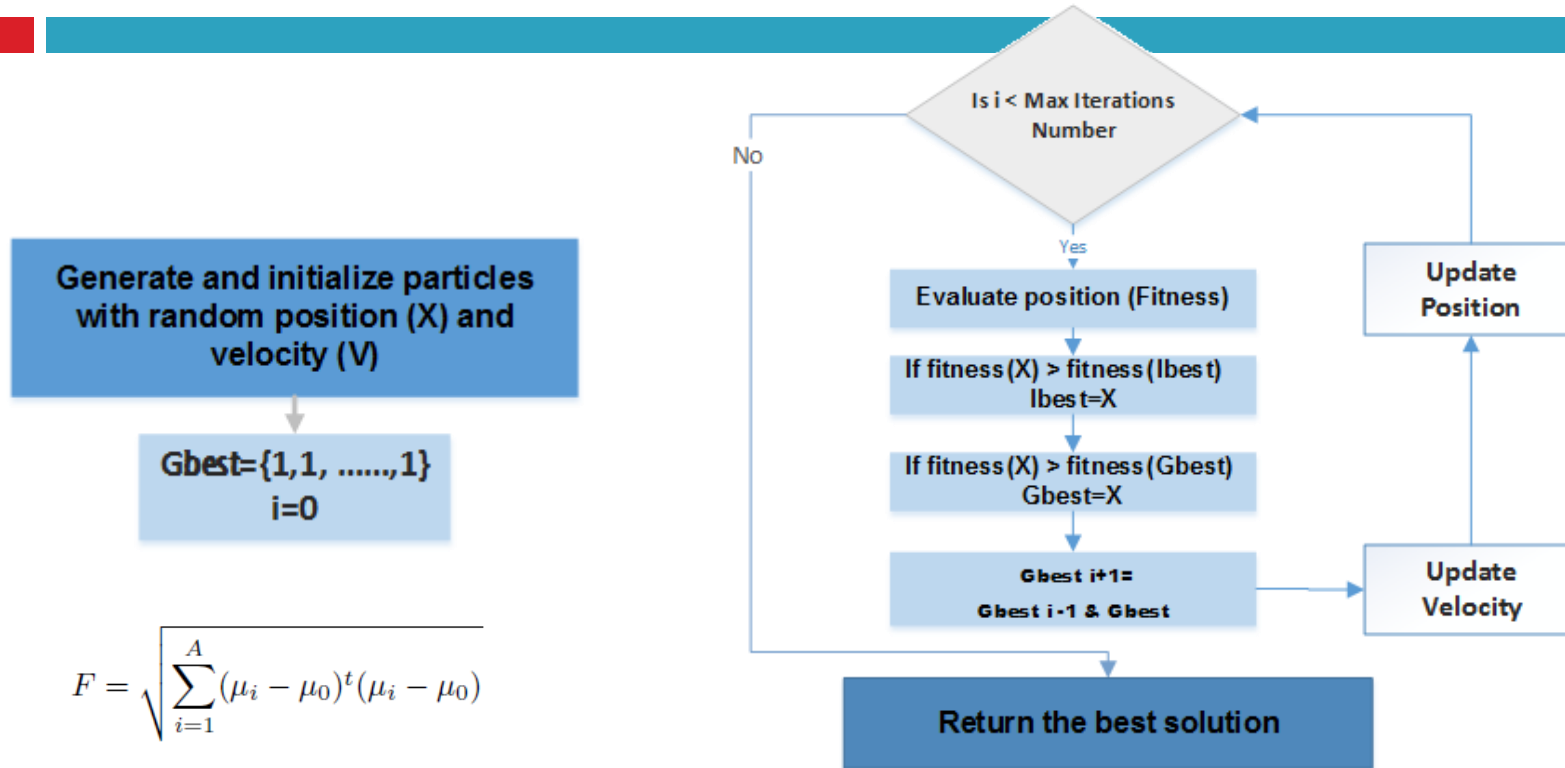
Phase II: Feature Extraction(TDCT)



Phase IV: Feature Selection

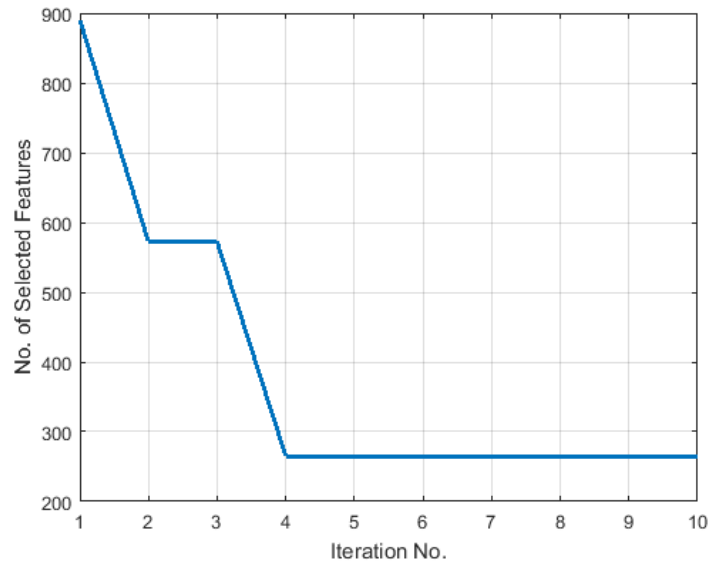


The Flowchart of DBPSO



DBPSO Results

- We have 1800 extracted features .
- 265 selected features using DBPSO.



Convergence Curve

Outline

- **Introduction.**
- **Problem Statement.**
- **Proposed Methodology:**
 - ❑ **Phase I** : Pre-processing.
 - ❑ **Phase II** : Segmentation.
 - ❑ **Phase III** : Feature Extraction.
 - ❑ **Phase IV** : Feature Selection.
- **Conclusions & Future Work.**



Conclusions & Future work

- ❑ Automatic *Periocular region* segmentation using Otsu-IFOA.
- ❑ Feature Extraction(Gabor Filter + TDCT).
- ❑ Feature Selection using DBPSO.
- ❑ Selected Features can be used for *Arabian Horse Identification System*.