

THESIS TITLE

by

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THESIS TITLE

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DATE OF APPROVAL: DD.MM.YYYY

## ACKNOWLEDGEMENTS

Acknowledgements come here...

## **ABSTRACT**

## **THESIS TITLE**

One page abstract will come here.

## ÖZET

## TEZ BAŞLIĞI

Bir sayfa uzunluğunda özet gelecektir.

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## LIST OF SYMBOLS

$a_{ij}$	Description of $a_{ij}$
$\mathbf{A}$	State transition matrix of a hidden Markov model
$\alpha$	Blending parameter <i>or</i> scale
$\beta_t(i)$	Backward variable
$\Theta$	Parameter set

## LIST OF ACRONYMS/ABBREVIATIONS

2D	Two Dimensional
3D	Three Dimensional
AAM	Active Appearance Model
ASM	Active Shape Model

## 1. INTRODUCTION

Start with an introduction...

## 2. EXPERIMENTS AND RESULTS

Experiments and results come here...

### 2.1. Sample Section

Always place some text after headings before putting a graphics into a section as seen in Figure 2.1.

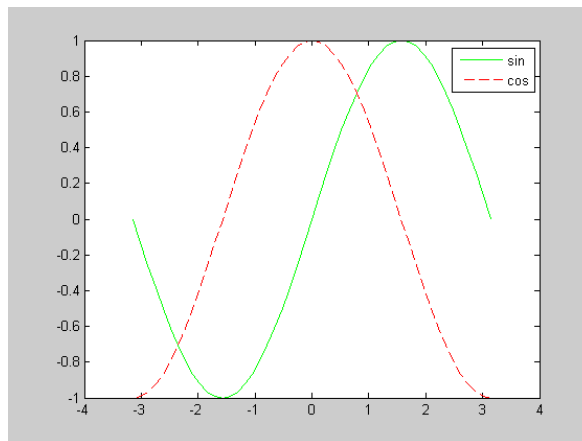


Figure 2.1. Sin and Cosine.

Now, let us cite some studies: one source as [1], two sources as [1,2] or you may cite three or more sources as [1–3]. Observe that they are ordered in the references chapter in the same order as they are cited. Let us put a sample table as seen in Table 2.1. Please pay attention that the caption is followed by a period.

Footnotes should be avoided as possible. If there is an absolute necessity, footnotes should be used as this.<sup>1</sup>

Item lists may be represented as follows:

---

<sup>1</sup>Example of a footnote

Table 2.1. Sample table.

	Header 1	Header 2
Row 1	Bla bla bla	Bla bla bla
Row 2	Bla bla bla	Bla bla bla

- This is an item. Do not use boldface for the items.
  - (i) This is a sub-item. Subsub-items are not allowed.
- Another item.

Item lists may also be represented as follows:

- (i) This is another enumerated item.
  - This is another sub-item.

**Theorem 2.1.** *The solutions of the equation  $ax^2 + bx + c = 0$  with  $a \neq 0$  are*

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

*Proof.* We use the method of completing the square to rewrite  $ax^2 + bx + c$ .

$$\begin{aligned}
 ax^2 + bx + c &= a \left( x^2 + \frac{b}{a}x \right) + c \\
 &= a \left( x^2 + \frac{b}{a}x + \left( \frac{b}{2a} \right)^2 - \left( \frac{b}{2a} \right)^2 \right) + c \\
 &= a \left( x + \frac{b}{2a} \right)^2 - a \left( \frac{b}{2a} \right)^2 + c \\
 &= a \left( x + \frac{b}{2a} \right)^2 - \frac{b^2 - 4ac}{4a}.
 \end{aligned}$$

Therefore  $ax^2 + bx + c = 0$  can be rewritten as

$$a \left( x + \frac{b}{2a} \right)^2 - \frac{b^2 - 4ac}{4a} = 0,$$

which can in turn be rearranged as

$$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}.$$

Taking square roots gives

$$x + \frac{b}{2a} = \frac{\pm\sqrt{b^2 - 4ac}}{2a}$$

which implies

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

as required. □

Finally, we will put a sample algorithm (PCA algorithm) using the relevant package in a figure as shown in Figure 2.1 and sample equations.

$$\bar{\mathbf{s}} = \frac{1}{N} \sum_{i=1}^N \mathbf{s}_i \tag{2.1}$$

$$\mathbf{Q} = \begin{bmatrix} \mathbf{s}_1 - \bar{\mathbf{s}} & \mathbf{s}_2 - \bar{\mathbf{s}} & \cdots & \mathbf{s}_N - \bar{\mathbf{s}} \end{bmatrix}_{2L \times N} \tag{2.2}$$

$$\mathbf{C}_s = \frac{1}{N} \mathbf{Q}^T \mathbf{Q} \tag{2.3}$$

$$\mathbf{C}_s \mathbf{e}_k = \lambda_k \mathbf{e}_k \tag{2.4}$$

```

Require  $\mathbf{s}_i$ ,  $i = 1, 2, \dots, N$  are normalized
Compute the mean  $\bar{\mathbf{s}}$  using Eq. 2.1;
Form the  $N \times 2L$  matrix  $\mathbf{Q}$  as defined in Eq. 2.2;
if  $N < 2 \times L$  then
     $\mathbf{Q} \leftarrow \mathbf{Q}^T$  ;
end if
Compute the covariance matrix  $\mathbf{C}_s$  using Eq. 2.3;
Decompose  $\mathbf{C}_s$  to its eigenvectors  $\mathbf{e}_k$  and eigenvalues  $\lambda_k$  satisfying Eq. 2.4;
if  $N < 2 \times L$  then
    for  $k = 1$  to  $K$  do
         $\mathbf{e}_k \leftarrow \mathbf{Q}\mathbf{e}_k$  ;
         $\mathbf{e}_k \leftarrow \mathbf{e}_k / \|\mathbf{e}_k\|$  (normalization);
    end for
end if

```

Figure 2.2. Principal Component Analysis Algorithm.

### **2.1.1. Example of First Subheadings**

Some text here

2.1.1.1. Example of Second Subheadings. Some text here too.



### 3. CONCLUSION

The conclusions of the thesis should come here.

## REFERENCES

1. Doebelin, E. O., *Control System Principles and Design*, John Wiley & Sons, Inc., New York, NY, USA, 1985.
2. Schneider, J., *The Extrasolar Planets Encyclopaedia*, 2010, <http://exoplanet.eu/catalog.php>, May 2011.
3. Aran, O., I. Ari, A. Guvensan, H. Haberdar, Z. Kurt, I. Turkmen, A. Uyar and L. Akarun, “A Database of Non-Manual Signs in Turkish Sign Language”, *Signal Processing and Communications Applications, 2007. SIU 2007. IEEE 15th*, pp. 1–4, 2007.
4. Liu, W., *Development of Finite Element Procedures for Fluid-Structure Interaction*, Ph.D. Thesis, California Institute of Technology, 1981.
5. Hoogendoorn, M., J. Treur and P. Yolum, “A Labeled Graph Approach to Analyze Organizational Performance”, *Proceedings of the 2006 IEEE/WIC/ACM International Conference on Intelligent Agent Technology*, 2006.

## APPENDIX A: APPLICATION

The appendices start here.