

DAFTAR ISI

| | |
|--|-----|
| LEMBAR PENGESAHAN TUGAS AKHIR | i |
| SURAT PERNYATAAN KARYA SENDIRI | ii |
| <i>ABSTRACT</i> | iii |
| ABSTRAK..... | iv |
| KATA PENGANTAR | v |
| DAFTAR ISI | vii |
| DAFTAR GAMBAR..... | x |
| DAFTAR TABEL | xii |
| BAB I PENDAHULUAN..... | 1 |
| 1.1 Latar Belakang..... | 1 |
| 1.2 Tinjauan Penelitian Terdahulu | 3 |
| 1.3 Rumusan Masalah | 7 |
| 1.4 Tujuan dan Manfaat..... | 7 |
| 1.4.1 Tujuan | 7 |
| 1.4.2 Manfaat | 7 |
| 1.5 Batasan Masalah..... | 7 |
| 1.6 Kerangka Berpikir | 8 |
| 1.7 Sistematika Penulisan..... | 9 |
| BAB II TEORI DASAR | 10 |
| 2.1 Panel Surya..... | 10 |
| 2.1.1 Panel Surya..... | 10 |
| 2.1.2 Jenis-jenis Panel Surya..... | 11 |
| 2.1.3 Pengaruh Debu pada Panel Surya | 12 |

| | | |
|---|---|----|
| 2.1.4. | Pembersih Debu Panel Surya | 13 |
| 2.2 | Sistem Kendali..... | 14 |
| 2.2.1. | Sistem Kendali terbuka | 15 |
| 2.2.2. | Sistem Kendali Tertutup | 15 |
| 2.3 | <i>Fuzzy Logic Control</i> | 16 |
| 2.3.1. | <i>Fuzzy Mamdani</i> | 17 |
| 2.3.2. | Sistem Kendali <i>Fuzzy Logic</i> | 18 |
| 2.4 | Arduino Mega..... | 21 |
| 2.5 | <i>Limit Switch</i> | 23 |
| 2.6 | <i>Real Time Clock (RTC)</i> | 23 |
| 2.7 | Motor DC..... | 24 |
| 2.8 | Relay..... | 25 |
| 2.9 | Driver Motor BTS7690 | 26 |
| 2.10 | MATLAB | 27 |
| 2.11 | <i>Finite State Machine</i> | 28 |
| BAB III METODE PENELITIAN | | 30 |
| 3.1 | Metodologi Penelitian | 30 |
| 3.1.1 | Studi Literatur | 30 |
| 3.1.2 | Identifikasi Masalah..... | 31 |
| 3.1.3 | Analisis Kebutuhan..... | 31 |
| 3.1.4 | Perancangan Sistem | 33 |
| 3.1.5 | Implementasi..... | 34 |
| 3.1.6 | Pengujian Alat..... | 35 |
| 3.1.7 | Analisis Hasil | 36 |
| BAB IV PERANCANGAN DAN IMPLEMENTASI | | 37 |

| | | |
|------------------------------------|--|----|
| 4.1 | Analisis Kebutuhan | 37 |
| 4.1.1 | Kebutuhan Fungsional | 37 |
| 4.1.2 | Kebutuhan Non Fungsional | 38 |
| 4.2 | Perancangan | 39 |
| 4.2.1. | Perancangan Sistem | 39 |
| 4.2.2. | Perancangan <i>Hardware</i> | 43 |
| 4.2.3. | Perancangan Pemodelan Fuzzy | 48 |
| 1) | Pemodelan <i>fuzzy logic control</i> pada sistem Pembersih debu otomatis | 49 |
| 2) | <i>Membership function input</i> | 49 |
| 3) | <i>Membership function output</i> | 52 |
| 4) | <i>Fuzzy rule base</i> | 54 |
| 4.3 | Implementasi | 55 |
| 4.3.1. | Implementasi <i>Hardware</i> | 55 |
| 4.3.2. | Implementasi <i>Software</i> | 56 |
| BAB V PENGUJIAN DAN ANALISIS | | 59 |
| 5.1 | Pengujian..... | 59 |
| 5.1.1 | Pengujian Ketepatan Modul <i>Real-Time Clock</i> | 59 |
| 5.1.2 | Pengujian Sensor Tegangan..... | 60 |
| 5.1.3 | Pengujian Sistem..... | 61 |
| 5.2 | Analisis..... | 70 |
| DAFTAR PUSTAKA | | 78 |
| LAMPIRAN | | 82 |