BAB V
KESIMPULAN DAN SARAN

Pada bab ini membahas kesimpulan dan saran dari hasil penelitian perancangan alat pengukur telapak kaki yang telah dilakukan. Kesimpulan menjawab rumusan masalah yang telah dipaparkan serta saran diberikan untuk penelitian selanjutnya.

V.1 Kesimpulan

Berdasarkan penelitian yang telah dilakukan, diperoleh kesimpulan berdasarkan hasil perancangan serta analisis yang telah dilakukan. Kesimpulan dipaparkan untuk menjawab rumusan masalah pada awal penelitian.

1. Rancangan alat pengukur tekanan telapak kaki terdiri dari mikrokontroler ESP32, sensor kapasitor FDC2214, dan *multiplexer* CD4052BE, serta sol yang di dalamnya terdapat delapan titik pengukuran menggunakan pelat tembaga sebagai kapasitor keping sejajar. Prinsip pengukuran tekanan telapak kaki yaitu mengukur perubahan nilai kapasitans akibat tekanan yang diberikan pada titik pengukuran. Data kapasitans dikirimkan ke komputer atau laptop melalui jaringan *Wi-Fi* dengan metode UDP. Data yang diterima oleh komputer atau laptop disimpan pada suatu *dataframe,* ditampilkan dalam bentuk grafik, dan dilakukan pengolahan data. Pengolahan data yang dilakukan terdiri dari *data filtering, data smoothing* menggunakan *moving average* dengan rata-rata lima data, serta melakukan *data normalization* menggunakan *min-max normalization.* Setelah penggunaan alat selesai dilakukan data tersebut disimpan pada komputer atau laptop dengan format *file* xlsx.
2. Evaluasi alat pengukur tekanan telapak kaki dilakukan berdasarkan aspek fungsionalitas serta *usability.* Evaluasi *fungsionalitas* dilakukan dengan pengujian internal berdasarkan fungsi pembacaan data, fungsi transmisi data, dan fungsi pengolahan data. Hasil untuk fungsi pembacaan data yaitu didapatkan persamaan regresi linear hubungan tekanan dengan nilai kapasitans dengan nilai *R-square* 0.909 hingga

0.996 namun belum dapat mengetahui tekanan dalam satuan Pascal karena adanya pengaruh dari kapasitans tubuh. Data tekanan yang didapatkan dapat digunakan untuk melihat beberapa informasi *gait* seseorang seperti waktu siklus *gait, cadence,* serta mengetahui korelasi tekanan kaki kanan dan kaki kiri. Fungsi transmisi data, sensor dan mikrokontroler dapat membaca dan mengirimkan data dari masing-masing sensor dengan kecepatan 13 data/detik sehingga dapat merekam aktivitas *gait* pada saat berjalan. Hasil fungsi pengolahan data, program yang dibuat telah mampu untuk melakukan pengolahan data. Evaluasi *usability* dilakukan dengan mengukur *effectiveness* menggunakan *task completion* serta *usefulness, ease to use,* dan *satisfaction* menggunakan kuesioner USE. Hasil pengujian *task completion* didapatkan nilai 91.07%. Hasil pengujian dengan kuesioner USE dengan skala 1 hingga 7 didapatkan rata-rata nilai *usefulness* 5.089, *ease of use* 5.221, dan *satisfaction* 5.020. Dari hasil tersebut perancangan alat yang dilakukan telah memenuhi aspek *usability.*

V.2 Saran

Terdapat beberapa saran berdasarkan penelitian yang telah dilakukan. Saran yang diberikan bertujuan untuk membantu penelitian selanjutnya agar lebih baik.

1. Melakukan penelitian lebih lanjut terkait dengan penggunaan dielektrik yang dapat meningkatkan sensitivitas titik pengukuran saat menerima tekanan telapak kaki.
2. Melakukan penelitian lebih lanjut terkait dengan penggunaan material yang dapat digunakan untuk menghilangkan pengaruh kapasitans tubuh agar didapatkan nilai tekanan dalam bentuk Pascal.
3. Penggunaan *kalman filter* untuk *data smoothing* untuk dapat mengurangi *noise* yang dihasilkan pada saat pengambilan data. *Kalman* filter cocok untuk digunakan karena membutuhkan memori dan daya komputasi yang rendah dan dapat digunakan untuk data *real-time.*
4. Melakukan penelitian lebih lanjut mengenai pengaruh pengguna yang berbeda seperti umur, jenis kelamin, berat badan dan dengan durasi yang lebih lama.

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