

DAFTAR ISI

	Hlm.
HALAMAN PERSETUJUAN.....	ii
HALAMAN PENGESAHAN.....	iii
HALAMAN PERNYATAAN TENTANG KEASLIAN TA	iv
HALAMAN PERSEMBAHAN.....	v
ABSTRAK	vi
ABSTRACT	vii
KATA PENGANTAR	viii
DAFTAR ISI.....	x
DAFTAR GAMBAR	xiv
DAFTAR TABEL.....	xv
DAFTAR LAMPIRAN.....	xvi
BAB I PENDAHULUAN.....	1
1.1 Latar Belakang Penelitian.....	1
1.2 Perumusan Masalah Penelitian.....	2
1.3 Tujuan Penelitian.....	2
1.4 Manfaat Penelitian.....	3
1.4.1 Bagi Penulis.....	3
1.4.2 Bagi Masyarakat	3
1.4.3 Bagi Akademik	3
1.5 Batasan Masalah Penelitian.....	3
1.6 Kerangka Pemikiran Penelitian	4
1.7 Sistematika Penulisan.....	6
BAB II KAJIAN LITERATUR	8
2.1 Tinjauan Pustaka	8
2.2 Landasan Teori	11
2.2.1 Data Mining	11
2.2.2 Machine Learning.....	12
2.2.3 Unsupervised Learning.....	13
2.2.4 K-Means.....	13
2.2.5 Elbow Method.....	14
2.2.6 Silhouette Score	15
2.2.7 Calinski Harabasz Index	16

2.2.8 Davis Bouldin Index	17
2.2.9 Spesifikasi Smartphone.....	17
2.2.10 Gradio	18
2.2.11 CRISP-DM.....	19
BAB III METODOLOGI PENELITIAN.....	23
3.1 Business Understanding	24
3.1.1 Determine Business Objective.....	25
3.1.2 Assess Situation	25
3.1.3 Determine Data Mining Goals.....	26
3.2 Data Understanding.....	26
3.2.1 Data Collection	27
3.2.2 Data Description	27
3.2.3 Data Quality Check.....	27
3.2.4 Initial Data Exploration	27
3.3 Data Preparation	28
3.3.1 Data Integration	29
3.3.2 Data Cleaning	29
3.3.3 Feature Transformation.....	29
3.3.4 Normalization	29
3.4 Modeling.....	30
3.4.1 Select Modeling	31
3.4.2 Build Model	31
3.4.3 Generate Test Design.....	31
3.4.4 Automatic Cluster Labeling.....	31
3.5 Evaluation.....	32
3.5.1 Evaluation Objectives	33
3.5.2 Evaluation Methods	33
3.5.3 Determining the Optimal Number of Klasters.....	34
3.5.4 Deployment Decision Basis.....	34
3.6 Deployment	35
3.6.1 Model Saving.....	35
3.6.2 System Integraton	35
3.6.3 Real-Time Prediction.....	36
3.6.4 System Testing.....	36
BAB IV HASIL DAN PEMBAHASAN	37
4.1 Hasil.....	37

4.1.1 Hasil Business Understanding	37
4.1.1.1 Determine Business Objective	37
4.1.1.2 Assess Situation.....	37
4.1.1.3 Determine Data Mining Goals	38
4.1.2 Hasil Data Understanding.....	38
4.1.2.1 Data Collection.....	38
4.1.2.2 Data Description.....	39
4.1.2.3 Data Quality Check.....	40
4.1.2.4 Initial Data Exploration.....	41
4.1.3 Hasil Data Preparation	43
4.1.3.1 Data Integration.....	43
4.1.3.2 Data Cleaning.....	43
4.1.3.3 Feature Transformation	44
4.1.3.4 Normalization.....	44
4.1.4 Hasil Modeling	46
4.1.4.1 Select Modeling	46
4.1.4.2 Build Model	47
4.1.4.3 Generate Test Design	47
4.1.4.4 Automatic Cluster Labeling	49
4.1.5 Hasil Evaluation.....	52
4.1.5.1 Evaluation Objective.....	52
4.1.5.2 Evaluation Methods	52
4.1.5.3 Determining the Optimal Number of Clusters	53
4.1.5.4 Deployment Decision Basis	54
4.1.6 Hasil Deployment	54
4.1.6.1 Model Saving	54
4.1.6.2 System Integration	55
4.1.6.3 Real-time Prediction.....	56
4.1.6.4 System Testing	56
4.2 Pembahasan	57
BAB V KESIMPULAN DAN SARAN.....	59
5.1 Kesimpulan.....	59
5.1.1 Kesimpulan Rumusan Masalah 1	59
5.1.2 Kesimpulan Rumusan Masalah 2	59
5.1.3 Kesimpulan Rumusan Masalah 3	60
5.2 Saran	60

DAFTAR PUSTAKA	62
LAMPIRAN.....	66
DAFTAR RIWAYAT HIDUP.....	67



DAFTAR GAMBAR

	Hlm.
Gambar 1. 1 Kerangka Pemikiran	5
Gambar 2. 1 Unsupervised Learning.....	13
Gambar 2. 2 K-Means Clustering.....	14
Gambar 2. 3 Elbow Method	15
Gambar 2. 4 Silhouette Score	16
Gambar 2. 5 CRISP-DM	20
Gambar 3. 1 Metodologi Penelitian.....	23
Gambar 3. 2 Bussines Understanding.....	24
Gambar 3. 3 Data Understanding	26
Gambar 3. 4 Data Preparation	28
Gambar 3. 5 Modeling.....	30
Gambar 3. 6 Evaluation	32
Gambar 3. 7 Deployment.....	35
Gambar 4. 1 Hasil Bussines Understanding	37
Gambar 4. 2 Dataset Kaggle.....	39
Gambar 4. 3 Distribusi Fitur Numerik.....	42
Gambar 4. 4 Data Cleaning	44
Gambar 4. 5 Distribusi Sebelum Normalisasi	45
Gambar 4. 6 Distribusi Setelah Dinormalisasi	46
Gambar 4. 7 Metode Elbow dan Silhouette Score.....	49
Gambar 4. 8 Visualisasi Pengelempokan Smartphone (PCA).....	51
Gambar 4. 9 Evaluasi Jumlah Klaster	53
Gambar 4. 10 Model Saving.....	55
Gambar 4. 11 Tampilan Antarmuka.....	55

DAFTAR TABEL

	Hlm.
Tabel 2. 1 State Of The Art.....	8
Tabel 4. 1 Daftar Fitur yang Digunakan	40
Tabel 4. 2 Data Quality Check.....	40
Tabel 4. 3 Parameter Model K-Means.....	47
Tabel 4. 4 Hasil Evaluasi Kualitas Clustering	53
Tabel 4. 5 Skenario Pengujian Sistem Web	56
Tabel 4. 6 Ringkasan Hasil Pembahasan Tiap Rumusan Masalah	57



DAFTAR LAMPIRAN

	Hlm.
Source Code 1. Model K-Means	66

