LAPORAN PROYEK AKHIR
PRAKTIKUM DATA SCIENCE

ANALISIS SENTIMENT TERHADAP PAKAIAN WANITA MENGGUNAKAN METHODE LDA (*Latent Dirichlet Allocation*)

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1. PENDAHULUAN

Pakaian adalah kebutuhan pokok manusia selain makanan dan tempat tinggal (rumah). Manusia membutuhkan pakaian untuk melindungi dan menutup dirinya. Namun seiring dengan perkembangan kehidupan manusia, pakaian juga digunakan sebagai simbol status, jabatan, ataupun kedudukan seseorang yang memakainya. Perkembangan mode dan jenis-jenis pakaian tergantung pada adat-istiadat, kebiasaan, dan budaya, pada suatu budaya juga terdapat ciri khas yang berbeda dengan budaya lain. Dengan hadirnya media sosial saat ini membuat penyebaran perkembangan mode pakaian menjadi sangat cepat.

Berbagai toko online mulai memanfaatkan momentum ini untuk menjaring banyak pelanggan baru, salah satunya pakaian wanita. Di masa pandemi, belanja online menjadi pilihan utama banyak orang. 92% mencoba cara baru untuk berbelanja, 57% berbelanja secara digital, dan 48% menggunakan aplikasi pengambilan dan pengiriman bahan makanan (Ferry Kusnowo, 2020). Banyak pelanggan baru yang tidak mengetahui kualitas produk yang dijual di toko online, sehingga membuat pelanggan baru mengecek *review* produk sebelum membeli. Nah, untuk memudahkan pelanggan baru menarik kesimpulan dari *review* yang mereka lihat, maka dilakukan pengujian data mining berupa *review* atau *review* pakaian wanita.

1.1 Analisis Sentiment

Analisis sentiment atau biasa dikenal dengan *opinion mining* adalah studi komputasi untuk mengidentifikasi dan mengungkapkan opini, sentiment, evaluasi, sikap, sentiment, subjektivitas, penilaian, atau pendapat yang terkandung dalam teks. Analisis sentiment juga merupakan metode untuk mengekstraksi data opini, memahami dan mengolah data teks secara otomatis untuk melihat sentiment yang terkandung dalam opini.

Ulasan adalah bagian dari kecerdasan manusia dan memainkan peran penting dalam pengambilan keputusan manusia. Manusia sebagian besar mengabaikan emosi dalam interaksi komputer karena perannya yang bias dalam komunikasi manusia ke manusia sehari-hari.

1.2 Preprocessing

Preprocessing merupakan salah satu tahapan penting dalam proses data mining. Data yang digunakan dalam proses penambangan tidak selalu dalam kondisi pemrosesan yang ideal. Terkadang terdapat berbagai permasalahan pada data yang mengganggu hasil dari proses mining itu sendiri, seperti *missing value, redundant data, outlier,* atau *format* data yang tidak sesuai dengan sistem. Oleh karena itu, untuk mengatasi permasalahan tersebut diperlukan tahapan preprocessing.

Preprocessing adalah salah satu tahapan yang menghilangkan masalah yang dapat mengganggu hasil pengolahan data. Dalam kasus klasifikasi dokumen menggunakan data tipe teks, beberapa proses biasanya dilakukan, termasuk pelipatan kasus, penyaringan (penghapusan tanda baca), penghapusan kata berhenti, *stemming, tokenisasi*, dll.

1.3 Shiny

Shiny adalah paket dalam R yang memungkinkan pengguna membangun aplikasi web interaktif. *Shiny* menggabungkan kekuatan komputasi statistik R dengan interaksinya dengan web interaktif modern. Struktur Shiny terdiri dari 4 blok atau komponen yaitu *global*, *ui*, *server* dan *run-app*.

Blok global berisi paket (perpustakaan) yang diperlukan agar jaringan berfungsi dengan baik. UI adalah fitur yang menentukan tampilan dan nuansa web dari aplikasi yang akan dijalankan. Fungsinya berisi semua input dan output yang akan ditampilkan di aplikasi. Server adalah fungsi yang mendefinisikan logika kerja analisis dari sisi server aplikasi. Run-App adalah fungsi aplikasi untuk memanggil UI dan Server untuk menjalankan aplikasi.

1.4 Algoritma *Latent Dirichlet Allocation* (LDA)

Analisis sentiment dapat membantu dalam mengekstrasi pendapat yang berasal dari sebuah dokumen, komentar, *review* produk, dan data-data lainnya sehingga akan lebih mudah dalam melakukan pemantauan. Salah satu metode untuk melakukan analisis sentiment adalah *Latent Dirichlet Allocation* (LDA) yang mampu digunakan untuk mengekstraksi topik dari kumpulan dokumen komentar, dimana topik tersebut direpresentasikan sebagai kemunculan kata-kata dengan probabilitas topik yang berbeda. Oleh karena itu diperlukan representasi data dalam bentuk visual yang mudah dipahami daripada teks dan tabel. Salah satu bentuk visualisasi data adalah *wordcloud* yang memberikan gambaran visual frekuensi kemunculan kata.

1.5 WordCloud

Wordcloud (juga dikenal sebagai awan teks atau awan tag) adalah cara untuk memvisualisasikan data teks. Grafik ini populer dalam penambangan teks karena mudah dipahami. Dengan menggunakan *wordcloud*, gambaran frekuensi kata dapat ditampilkan dalam bentuk yang menarik namun tetap informatif. Semakin sering sebuah kata digunakan, semakin besar kata tersebut akan muncul di wordcloud.

Pada projek ini, kami menggunakan label rating sebagai representasi dari klasifikasi jenis komentar. Berikut ini prosesnya :

No	Id	Review Text	Rating	Positive Feedback Count	Class Name
1	1077	I had such high hopes for this dress and really wanted it to work for me. i initially ordered the petite small (my usual size) but i found this to be outrageously small. so small in fact that i could not zip it up! i reordered it in petite medium,	3	0	Dresses

		which was just ok. overall, the top half was comfortable and fit nicely, but the bottom half had a very tight under layer and several somewhat cheap (net) over layers. imo, a major design flaw was the net over layer sewn directly into the zipper - it			
2	1049	I love, love, love this jumpsuit. it's fun, flirty, and fabulous! every time i wear it, i get nothing but great compliments!	5	0	Pants
3	1077	I love this dress. i usually get an xs but it runs a little snug in bust so i ordered up a size. very flattering and feminine with the usual retailer flair for style.	5	0	Dresses
4	767	Bought the black xs to go under the larkspur midi dress because they didn't bother lining the skirt portion (grrrrrrrrrrr). my stats are 34a-28/29-36 and the xs fit very smoothly around the chest and was flowy around my lower half, so i would say it's running big. the straps are very pretty and it could easily be nightwear too. i'm 5'6" and it came to just below my knees.	5	0	Intimates
5	949	I have been waiting for this sweater coat to ship for weeks and i was so excited for it to arrive. this coat is not true to size and made me look short and squat. the sleeves are very wide (although long). as a light weight fall coat the sleeves don't need to be as wide because you wouldn't be layerng too much underneath. the buttons need to be moved at least three inches in for a nicer fit. i thought about redoing the buttons	2	0	Sweaters

		myself but the sleeves looked even more out of proportion with a tigh			

Setelah data diperoleh data kemudian diklasifikasi sebagai komentar positif atau negatif berdasarkan ratingnya. Untuk rating kurang dari atau sama dengan 3 maka akan diklasifikasikan sebagai komentar negatif, sedangkan untuk rating lebih dari 3 akan diklasifikasikan sebagai komentar positif.

No	Id	Review Text	Rating	Positive Feedback Count	Class Name	Klasifikasi
1	1077	I had such high hopes for this dress and really wanted it to work for me. i initially ordered the petite small (my usual size) but i found this to be outrageously small. so small in fact that i could not zip it up! i reordered it in petite medium, which was just ok. overall, the top half was comfortable and fit nicely, but the bottom half had a very tight under layer and several somewhat cheap (net) over layers. imo, a major design flaw was the net over layer sewn directly into the zipper - it	3	0	Dresses	Negatif
2	1049	I love, love, love this jumpsuit. it's fun, flirty, and fabulous! every time i wear it, i get nothing but great compliments!	5	0	Pants	Positif
3	1077	I love this dress. i usually get an xs but it runs a little snug in bust so i ordered up a size. very flattering and feminine with the usual retailer flair for style.	5	0	Dresses	Positif
4	767	Bought the black xs to go under the larkspur midi dress because they didn't bother lining the skirt portion (grrrrrrrrrrr). my stats are 34a-28/29-36 and the xs fit very smoothly around the chest and was flowy around my lower half, so i would say it's running big. the	5	0	Intimates	Positif

		straps are very pretty and it could easily be nightwear too. i'm 5'6" and it came to just below my knees.				
5	949	I have been waiting for this sweater coat to ship for weeks and i was so excited for it to arrive. this coat is not true to size and made me look short and squat. the sleeves are very wide (although long). as a light weight fall coat the sleeves don't need to be as wide because you wouldn't be layerng too much underneath. the buttons need to be moved at least three inches in for a nicer fit. i thought about redoing the buttons myself but the sleeves looked even more out of proportion with a tigh	2	0	Sweaters	Negatif

2. METODE

Proses penelitian menggunakan teknik unsupervised learning yang dijelaskan oleh (*Vishwanathan* dan *Smola*, 2010). unsupervised learning merupakan salah satu tipe algoritma *machine learning* yang digunakan untuk menarik kesimpulan dari dataset. Metode ini hanya akan mempelajari suatu data berdasarkan kedekatannya saja atau yang biasa disebut dengan *clustering*. Proses *clustering* menggunakan metode *unsupervised learning* untuk menghasilkan klaster positif dan negatif dari *review* pakaian wanita.

2.1 Pengumpulan Data

Pengumpulan data *training review women's clothing e-commerce* menggunakan parameter yang sudah tersedia dari website https://www.kaggle.com untuk mendapatkan *review* kategori positif atau negatif. Data yang telah diambil disimpan dalam file data womensclothing.csv dan akan dilanjutkan proses preprocessing data.

2.2 Preprocessing

Preprocessing dilakukan mulai dari proses *cleaning* untuk mempermudah proses analisis seperti menghilangkan tanda baca atau *punctuation* dan juga *hashtag* atau *mention.* Kemudian proses merubah semua huruf menjadi huruf kecil *tolower* dan terakhir yaitu proses menghapus *stopword* atau kata yang tidak sesuai dengn kaidah Bahasa Indonesia, mengubah kata yang terdapat imbuhan menjadi kata dasar *stemming*, mengubah kata yang mempunyai makna menjadi hanya sebuah kata *lemmatisasi* dan

terakhir mengubah kata yang *typo* menjadi kata baku *slankword* sehingga setelah *preprocessing* selesai maka data sudah dapat diolah.

2.3 Topic *Modeling Latent Dirichlet Allocation* (LDA)

Latent Dirichlet Allocation (LDA) digunakan untuk menentukan topik secara otomatis dari sekumpulan ulasan *review*. Ulasan *review* yang diteliti memiliki struktur tersembunyi (hidden structure) berupa topik, distribusi topik per ulasan review, dan penentuan topik per kata dalam setiap ulasan *review*. LDA menggunakan kumpulan ulasan *review* tersebut untuk inference struktur topik tersembunyi. Jumlah topik yang akan dihasilkan telah ditentukan sebelum proses LDA dilaksanakan.

Setelah model topik LDA dibuat, sebuah ulasan *review* dapat ditentukan distribusi topiknya yang mendeskripsikan kumpulan kata dalam ulasan *review*. LDA menggunakan asumsi *bag of words*, yaitu urutan kemunculan kata dalam dokumen diabaikan.

2.4 WordCloud

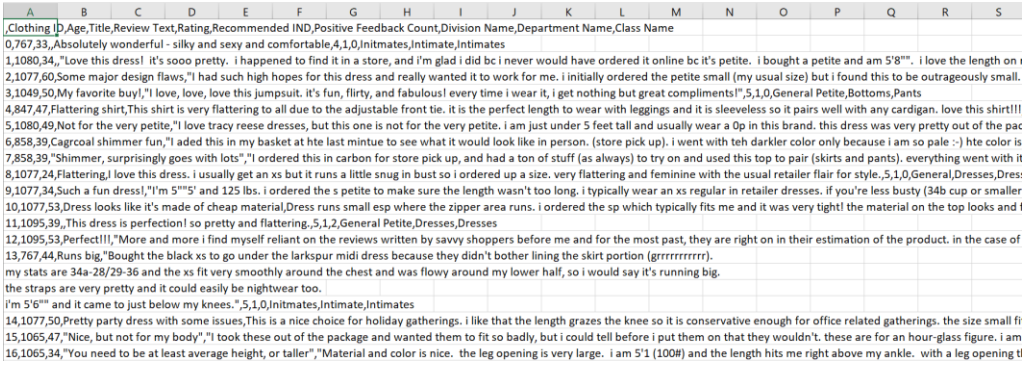
Pembuatan *wordcloud* menggunakan package *wordcloud* dan dapat diinstal dalam R-studio dari repositori *CRAN* kemudian dikerjakan dalam dua tahap, yaitu persiapan data dan pembuatan *wordcloud*. Data yang diambil berupa kumpulan kata negatif dan positif yang sudah diklasifikasikan. Kemudian tampilan *wordcloud* kata negatif berwarna hitam dan berada di bagian atas sedangkan kata positif berwarna biru yang berada dibagian bawah. Total kata yang ditampilkan dalam word cloud berisi 200 kata negatif dan positif.

3. HASIL DAN PEMBAHASAN

Pada Penelitian proyek ini data diolah dengan algoritma *Latent Dirichlet Allocation* (LDA). Berikut adalah hasil dan pembahasan dari langkah uji coba yang dilakukan pada analisis :

3.1 Pengumpulan data

Data didapatkan dari kaggle, Data yang diambil berformat csv yang dilakukan pengumpulan data menggunakan library (vroom) dengan aplikasi RStudio, didapatkan 23.486 komentar.



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S

,Clothing ID,Age,Title,Review Text,Rating,Recommended IND,Positive Feedback Count,Division Name,Department Name,Class Name
0,767,33,,Absolutely wonderful - silky and sexy and comfortable,4,1,0,Initmates,Intimate,Intimates
1,1080,34,,"Love this dress! it's sooo pretty. i happened to find it in a store, and i'm glad i did bc i never would have ordered it online bc it's petite. i bought a petite and am 5'8"". i love the length on
2,1077,60,Some major design flaws,"I had such high hopes for this dress and really wanted it to work for me. i initially ordered the petite small (my usual size) but i found this to be outrageously small.
3,1049,50,My favorite buy!,"I love, love, love this jumpsuit. it's fun, flirty, and fabulous! every time i wear it, i get nothing but great compliments!",5,1,0,General Petite,Bottoms,Pants
4,847,47,Flattering shirt,This shirt is very flattering to all due to the adjustable front tie. it is the perfect length to wear with leggings and it is sleeveless so it pairs well with any cardigan. love this shirt!!!
5,1080,49,Not for the very petite,"I love tracy reese dresses, but this one is not for the very petite. i am just under 5 feet tall and usually wear a 0p in this brand. this dress was very pretty out of the pac
6,858,39,Cagrcoal shimmer fun,"I aded this in my basket at hte last mintue to see what it would look like in person. (store pick up). i went with teh darkler color only because i am so pale :-) hte color is
7,858,39,"Shimmer, surprisingly goes with lots","I ordered this in carbon for store pick up, and had a ton of stuff (as always) to try on and used this top to pair (skirts and pants). everything went with it
8,1077,24,Flattering,I love this dress. i usually get an xs but it runs a little snug in bust so i ordered up a size. very flattering and feminine with the usual retailer flair for style.,5,1,0,General,Dresses,Dres
9,1077,34,Such a fun dress!,"I'm 5""5' and 125 lbs. i ordered the s petite to make sure the length wasn't too long. i typically wear an xs regular in retailer dresses. if you're less busty (34b cup or smaller
10,1077,53,Dress looks like it's made of cheap material,Dress runs small esp where the zipper area runs. i ordered the sp which typically fits me and it was very tight! the material on the top looks and f
11,1095,39,,This dress is perfection! so pretty and flattering.,5,1,2,General Petite,Dresses,Dresses
12,1095,53,Perfect!!!,"More and more i find myself reliant on the reviews written by savvy shoppers before me and for the most past, they are right on in their estimation of the product. in the case of
13,767,44,Runs big,"Bought the black xs to go under the larkspur midi dress because they didn't bother lining the skirt portion (grrrrrrrrrrr).
my stats are 34a-28/29-36 and the xs fit very smoothly around the chest and was flowy around my lower half, so i would say it's running big.
the straps are very pretty and it could easily be nightwear too.
i'm 5'6"" and it came to just below my knees.",5,1,0,Initmates,Intimate,Intimates
14,1077,50,Pretty party dress with some issues,This is a nice choice for holiday gatherings. i like that the length grazes the knee so it is conservative enough for office related gatherings. the size small fi
15,1065,47,"Nice, but not for my body","I took these out of the package and wanted them to fit so badly, but i could tell before i put them on that they wouldn't. these are for an hour-glass figure. i am
16,1065,34,"You need to be at least average height, or taller","Material and color is nice. the leg opening is very large. i am 5'1 (100#) and the length hits me right above my ankle. with a leg opening t

Gambar 1. Hasil Crawling Data

3.2 Preprocessing

Setelah mendapatkan data kotor dari *Kaggle*, langkah selanjutnya adalah preprocessing. Melalui tahapan ini, dataset kotor diproses melalui berbagai proses seperti: penghapusan URL, "\n", koma, RT, titik dua, titik koma, titik dua, dan simbol. Tujuan dari proses ini sendiri adalah untuk menghasilkan kumpulan data yang bersih. Berikut adalah contoh hasil dari 5 data yang telah dilakukan tahap *preprocessing.*

Tabel 1. Hasil Preprocessing

NO	Ulasan
1	Absolutely wonderful - silky and sexy and comfortable
2	Love this dress! it's sooo pretty. i happened to find it in a store, and i'm glad i did bc i never would have ordered it online bc it's petite. i bought a petite and am 5'8". i love the length on me- hits just a little below the knee. would definitely be a true midi on someone who is truly petite.
3	I had such high hopes for this dress and really wanted it to work for me. i initially ordered the petite small (my usual size) but i found this to be outrageously small. so small in fact that i could not zip it up! i reordered it in petite medium, which was just ok. overall, the top half was comfortable and fit nicely, but the bottom half had a very tight under layer and several somewhat cheap (net) over layers. imo, a major design flaw was the net over layer sewn directly into the zipper - it c
4	I love, love, love this jumpsuit. it's fun, flirty, and fabulous! every time i wear it, i get nothing but great compliments!
5	Dress runs small esp where the zipper area runs. i ordered the sp which typically fits me and it was very tight! the material on the top looks and feels very cheap that even just pulling on it will cause it to rip the fabric. pretty disappointed as it was going to be my christmas dress this year! needless to say it will be going back.

Berikut adalah contoh hasil dari data yang sudah dilakukan pelabelan menggunakan algoritma pencocokan sederhana, dapat dilihat pada Tabel 2.

Tabel 2. Hasil Scoring

NO	Ulasan	Age	Klasifikasi
1	Absolutely wonderful - silky and sexy and comfortable	33.00	Positif
2	Love this dress! it's sooo pretty. i happened to find it in a store, and i'm glad i did bc i never would have ordered it online bc it's petite. i bought a petite and am 5'8". i love the length on me- hits just a little below the knee. would definitely be a true midi on someone who is truly petite.	34.00	Positif
3	I had such high hopes for this dress and really wanted it to work for me. i initially ordered the petite small (my usual size) but i found this to be outrageously small. so small in fact that i could not zip it up! i reordered it in petite medium, which was just ok. overall, the top half was comfortable and fit nicely, but the bottom half had a very tight under layer and several	60.00	Negatif

	somewhat cheap (net) over layers. imo, a major design flaw was the net over layer sewn directly into the zipper - it c		
4	I love, love, love this jumpsuit. it's fun, flirty, and fabulous! every time i wear it, i get nothing but great compliments!	50.00	Positif
5	Dress runs small esp where the zipper area runs. i ordered the sp which typically fits me and it was very tight! the material on the top looks and feels very cheap that even just pulling on it will cause it to rip the fabric. pretty disappointed as it was going to be my christmas dress this year! needless to say it will be going back.	53.00	Negatif

3.3 Menghitung Probabilitas Kata

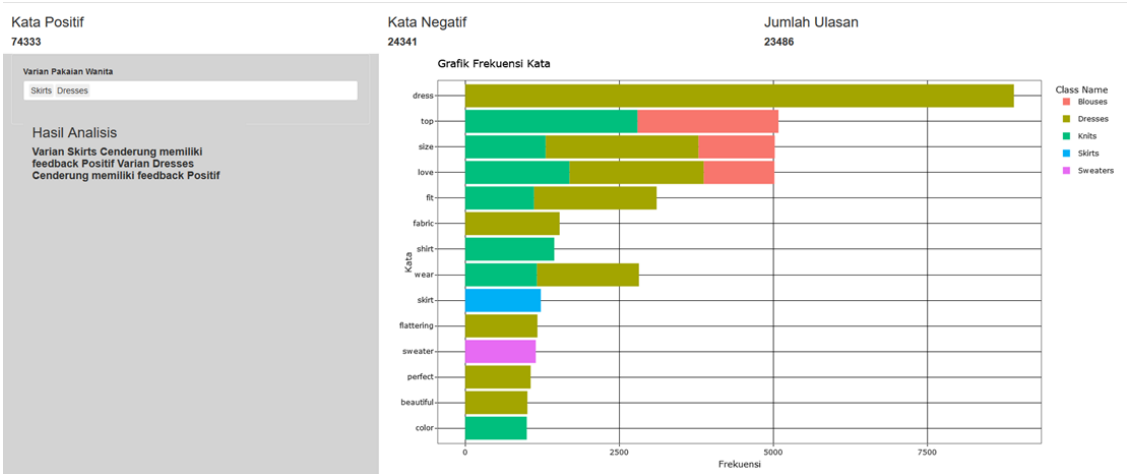
Berikut merupakan perhitungan probabilitas dari sebuah *corpus* berdasarkan notasi yang telah dijelaskan

$$p(D|\alpha,\beta)=\prod_{d=1}^{M}\int p(\theta_d|\alpha)\left(\prod_{n=1}^{N_d}\sum_{Z_{dn}}p(Z_{dn}|\theta_d)p(w_{dn}|Z_{dn},\beta)\right)d\theta_d$$

Dapat dilihat bahwa pada notasi **β** mendeskripsikan topik, dimana pada setiap **β** merupakan distribusi dari sejumlah kata. Pada Variabel **θd** adalah variabel level dokumen dengan satu kali sampel per dokumen yang merepresentasikan proporsi topik untuk dokumen ke d. Pada notasi zdn dan wdn merupakan representasi variabel di level kata dengan satu kali sampel untuk masing-masing kata pada setiap dokumen.

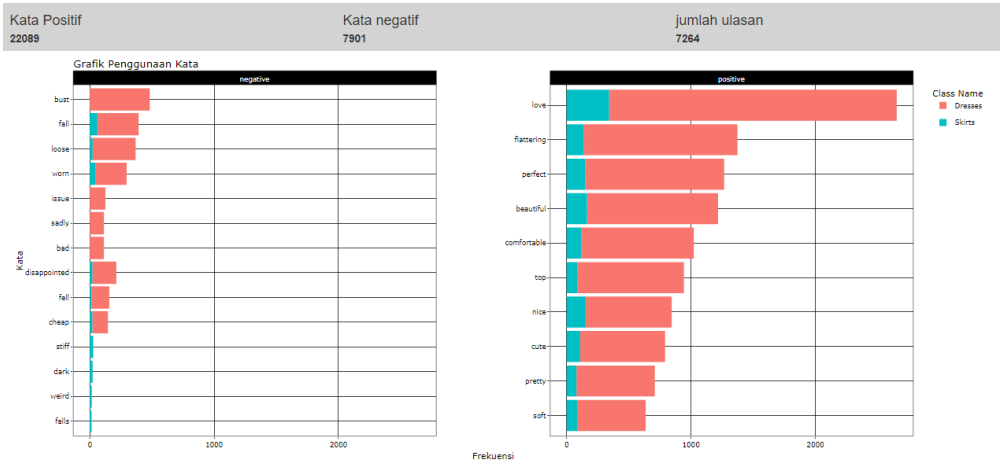
3.4 Tampilan shiny

Setelah Seluruh data sudah dibersihkan dan difilter, kita akan mendapatkan grafik *interface* hasil Sentimentt Analysis pakaian wanita yang sudah dikategorikan menjadi beberapa variasi seperti (*blouses, dresses, knits, skirts, sweaters*) dan kesimpulan hasil analisis sesuai dengan varian yang dipilih, yang dapat dilihat pada gambar dibawah :



Gambar 2. *Word Frequency Graphic*

Hasil dari polaritas yang diambil berdasarkan ulasan review dikategorikan menjadi dua bentuk analisis polaritas seperti: Positif dan Negatif. Sehingga dapat Menunjukkan jumlah masing-masing kategori polaritas. Dari hasil yang didapatkan sebelumnya disajikan ke dalam bentuk grafik interface yang terlihat pada Gambar 3. untuk mempermudah proses pembacaan hasil akhir.



Gambar 3. *Word Usage Graohic*

3.4 Tampilan Shiny Tabel Data

Shiny juga dapat menampilkan tabel dari data yang sudah diolah. Data yang sudah melalui tahap *preprocessing* pada tampilan dalam bentuk tabel dan dimuat dalam beberapa halaman karena terdapat banyak data.

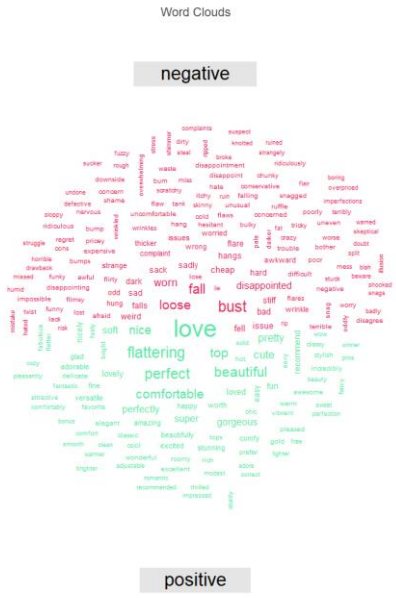
Tabel Ulasan

Age	Title	Review Text	Positive Feedback Count	Class Name
33.00	NA	Absolutely wonderful - silky and sexy and comfortable	Positif	Intimates
34.00	NA	Love this dress! it's sooo pretty. i happened to find it in a store, and i'm glad i did bc i never would have ordered it online bc it's petite. i bought a petite and am 5'8". i love the length on me- hits just a little below the knee. would definitely be a true midi on someone who is truly petite.	Positif	Dresses
60.00	Some major design flavs	I had such high hopes for this dress and really wanted it to work for me. i initially ordered the petite small (my usual size) but i found this to be outrageously small. so small in fact that i could not zip it up! i reordered it in petite medium, which was just ok. overall, the top half was comfortable and fit nicely, but the bottom half had a very tight under layer and several somewhat cheap (net) over layers. imo, a major design flaw was the net over layer sewn directly into the zipper - it c	Negatif	Dresses
50.00	My favorite buy!	I love, love, love this jumpsuit. it's fun, flirty, and fabulous! every time i wear it, i get nothing but great compliments!	Positif	Pants
47.00	Flattering shirt	This shirt is very flattering to all due to the adjustable front tie. it is the perfect length to wear with leggings and it is sleeveless so it pairs well with any cardigan. love this shirt!!!	Positif	Blouses
49.00	Not for the very petite	I love tracy reese dresses, but this one is not for the very petite. i am just under 5 feet tall and usually wear a 0p in this brand. this dress was very pretty out of the package but its a lot of dress. the skirt is long and very full so it overwhelmed my small frame. not a stranger to alterations, shortening and narrowing the skirt would take away from the embellishment of the garment. i love the color and the idea of the style but it just did not work on me. i returned this dress.	Negatif	Dresses
39.00	Cagrcoal shimmer fun	I aded this in my basket at hte last mintue to see what it would look like in person. (store pick up). i went with teh darkler color only because i am so pale :-) hte color is really gorgeous, and turns out it mathced everything i was trying on with it prefectly. it is a little baggy on me and hte xs is hte msallet size (bummer, no petite). i decided to jkeep it though, because as i said, it matvehd everything. my ejans, pants, and the 3 skirts i waas trying on (of which i jkept all) oops.	Positif	Knits
39.00	Shimmer, surprisingly goes with lots	I ordered this in carbon for store pick up, and had a ton of stuff (as always) to try on and used this top to pair (skirts and pants). everything went with it. the color is really nice charcoal with shimmer, and went well with pencil skirts, flare pants, etc. my only compaint is it is a bit big, sleeves are long and it doesn't go in petite. also a bit loose for me, but no xxs... so i kept it and wil ldecide later since the light color is already sold out in hte smallest size...	Positif	Knits
24.00	Flattering	I love this dress. i usually get an xs but it runs a little snug in bust so i ordered up a size. very flattering and feminine with the usual retailer flair for style.	Positif	Dresses
34.00	Such a fun dress!	I'm 5'5' and 125 lbs. i ordered the s petite to make sure the length wasn't too long. i typically wear an xs regular in retailer dresses. if you're less busty (34b cup or smaller), a s petite will fit you perfectly (snug, but not tight). i love that i could dress it up for a party, or down for work. i love that the tulle is longer then the fabric underneath.	Positif	Dresses
53.00	Dress looks like it's made of cheap material	Dress runs small esp where the zipper area runs. i ordered the sp which typically fits me and it was very tight! the material on the top looks and feels very cheap that even just pulling on it will cause it to rip the fabric. pretty disappointed as it was going to be my christmas dress this year! needless to say it will be going back.	Negatif	Dresses
39.00	NA	This dress is perfection! so pretty and flattering.	Positif	Dresses
53.00	Perfect!!!	More and more i find myself reliant on the reviews written by savvy shoppers before me and for the most past, they are right on in their estimation of the product. in the case of this dress-if it had not been for the reveiws-i doubt i would have even tried this. the dress is beautifully made, lined and reminiscent of the old retailer quality. it is lined in the solid periwinkle-colored fabric that matches the outer fabric print. fits and very form-fitting. falls just above the knee and does not rid	Positif	Dresses
44.00	Runs big	Bought the black xs to go under the larkspur midi dress because they didn't bother lining the skirt portion (grrrrrrrrrr). my stats are 34a-28/29-36 and the xs fit very smoothly around the chest and was flowy around my lower half, so i would say it's running big. the straps are very pretty and it could easily be nightwear too. i'm 5'6" and it came to just below my knees.	Positif	Intimates
50.00	Pretty party dress with some issues	This is a nice choice for holiday gatherings. i like that the length grazes the knee so it is conservative enough for office related gatherings. the size small fit me well - i am usually a size 2/4 with a small bust. in my opinion it runs small and those with larger busts will definitely have to size up (but then perhaps the waist will be too big). the problem with this dress is the quality. the fabrics are terrible. the delicate netting type fabric on the top layer of skirt got stuck in the zip	Negatif	Dresses
47.00	Nice, but not for my body	I took these out of the package and wanted them to fit so badly, but i could tell before i put them on that they wouldn't. these are for an hour-glass figure. i am more straight up and down. the waist was way too small for my body shape and even if i sized up, i could tell they would still be tight in the waist and too roomy in the hips - for me. that said, they are really nice. sturdy, linen-like fabric, pretty color, well made. i hope they make someone very happy!	Positif	Pants
34.00	You need to be at least average height, or taller	Material and color is nice. the leg opening is very large. i am 5'1 (100#) and the length hits me right above my ankle. with a leg opening the size of my waist and hem line above my ankle, and front pleats to make me fluffy, i think you can imagine that it is not a flattering look. if you are at least average height or taller, this may look good on you.	Negatif	Pants
41.00	Looks great with white pants	Took a chance on this blouse and so glad i did. i wasn't crazy about how the blouse is photographed on the model. i paired it whit white pants and it worked perfectly. crisp and clean is how i would describe it. launders well. fits great. drape is perfect. wear tucked in or out - can't go wrong.	Positif	Blouses
32.00	Super cute and cozy	A flattering, super cozy coat. will work well for cold, dry days and will look good with jeans or a dressier outfit. i am 5' 5", about 135 and the small fits great.	Positif	Outerwear
47.00	Stylish and comfortable	I love the look and feel of this tulle dress. i was looking for something different, but not over the top for new year's eve. i'm small chested and the top of this dress is form fitting for a flattering look. once i steamed the tulle, it was perfect! i ordered an xsp. length was perfect too.	Positif	Dresses
33.00	Cute, crisp shirt	If this product was in petite, i would get the petite. the regular is a little long on me but a tailor can do a simple fix on that. fits nicely! i'm 5'4, 130lb and pregnant so i bough t medium to grow into. the tie can be front or back so provides for some nice flexibility on form fitting.	Positif	Blouses

Gambar 4. Tabel Data

3.5 Tampilan Shiny Wordcloud

Shiny juga menampilkan *wordcloud* dari hasil analisis. Hasil dari *wordcloud* diambil berdasarkan ulasan review yang dikategorikan menjadi dua bentuk analisis yaitu kata negatif dan positif seperti gambar 5. Semakin besar kata dalam *wordcould* yang ditampilkan maka kata tersebut adalah kata yang paling banyak atau sering digunakan dalam ulasan review.



Gambar 5. Wordcloud

3.6 Listing Program

```
---
title: "Project Akhir Prak DS"
author: "Fatin Luthfi Salman 123200071 || Shakira Luthfiani A 123200165"
date: "11/20/2022"
output: html_document
---
```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
```

global
```{r global}
# Daftar library Yang digunakan
library(dplyr)#untuk memanipulasi data
library(shiny)#untuk membuat web sederhana
library(shinyWidgets)
library(tidyverse)#untuk mengolah data
library(vroom)#untuk import data dari file
```
```

```
library(here)#untuk menemukan file
library(tidytext)#untuk text mining
library(ggplot2)#untuk visualisasi data dalam bentuk grafik
library(plotly)#untuk visualisasi grafik pada web
library(tm)#text mining
library(memoise)#session
library(wordcloud)
library(wordcloud2)
library(reshape2)#untuk membentuk data
```

Listing 3.1 Deklarasi *library* yang digunakan

```
```
hitung_ulasan = function()
{
  wclothing %>%
    nrow()
}

hitung_sentimen = function(x)
{
  wclothing %>%
    unnest_tokens(word, `Review Text`) %>%
    anti_join(stop_words) %>%
    inner_join(get_sentiments("bing")) %>%
    count(sentiment) %>%
    filter(sentiment==x)
}
```
```

Listing 3.2 Penghitungan jumlah data dan data *cleaning*

```
```
table_wclothing = function()
{
  wclothing %>%
    mutate(`Positive Feedback Count` = case_when(
      `Rating` <= 3 ~ "Negatif",
      TRUE ~ "Positif"
    )) %>%
    select(Age,Title,`Review Text`,`Positive Feedback Count`,`Class
Name`) %>%
    head(50)
}
```
```

Listing 3.3 Pengklasifikasian data

```
```
table_wclothing = function()
{
  wclothing %>%
    mutate(`Positive Feedback Count` = case_when(
      `Rating` <= 3 ~ "Negatif",
      TRUE ~ "Positif"
    )) %>%
```
```

```
    select(Age,Title,`Review Text`,`Positive Feedback Count`,`Class
Name`) %>%
    head(50)
}
```
```

**Listing 3.3** Pengklasifikasian data

```
`ui`
```{r ui}
ui = fluidPage(
  setBackgroundColor("lightgray"),
  title = "Analisis Sentimen terhadap Pakaian Wanita di E-Commerce",
  headerPanel("Analisis Sentimen terhadap Pakaian Wanita di E-
Commerce"),

  fluidRow(
    column(
      4,
      h3("Kata Positif"),
      h4(strong(textOutput(outputId = "jumlah_positif"))),
      style = "background-color: white ; background-size: cover;"
    ),
    column(
      4,
      h3("Kata Negatif"),
      h4(strong(textOutput(outputId = "jumlah_negatif"))),
      style = "background-color: white ; background-size: cover;"
    ),
    column(
      4,
      h3("Jumlah Ulasan"),
      h4(strong(textOutput(outputId = "jumlah_ulasan"))),
      style = "background-color: white ; background-size: cover;"
    ),
  ),

  sidebarLayout(
    sidebarPanel(
      style = "background-color: lightgray ; background-size:
cover;",
      selectInput(
        inputId = "Class Name",
        label = "Varian Pakaian Wanita",
        choices = option_classname,
        multiple = TRUE,
        selected = option_classname[[1]]
      ),
      column(
        8,
        h3("Hasil Analisis"),
        h4(strong(textOutput(outputId = "d_analisis"))),
        style = "background-color: lightgray; background-size:
cover;"
```

```
      )
    ),

    mainPanel(
      style = "background-color: white ; background-size: cover;",
      plotlyOutput(outputId = "plot_freq_kata", height = "700px"),
      br(),
      fluidRow(
        column(
          4,
          h3("Kata Positif"),
          h4(strong(textOutput(outputId = "jumlahpositif"))),
          style="background-color:  lightgray  ;  background-size:
cover;"
        ),
        column(
          4,
          h3("Kata negatif"),
          h4(strong(textOutput(outputId = "jumlahnegatif"))),
          style="background-color:  lightgray  ;  background-size:
cover;"
        ),
        column(
          4,
          h3("jumlah ulasan"),
          h4(strong(textOutput(outputId = "jumlahulasan"))),
          style="background-color:  lightgray  ;  background-size:
cover;"
        )
      ),
      plotlyOutput(outputId  =  "plot_kata_digunakan",  height  =
"700px"),
      h3("Word Clouds", align = "center"),
      plotOutput(outputId = "plot_cloud_kata", height = "1200px"),
      h3("Tabel Ulasan"),
      tableOutput(outputId = "plot_ulasan")
    )
  )
)
```

Listing 3.4 *User Interface*

```
**`server`**
```{r server}
server = function(input, output, session)
{
  plot_freq_kata = reactive({
    wclothing %>%
      group_by(`Class Name`) %>%
      unnest_tokens(word, `Review Text`) %>%
      group_by(`Class Name`) %>%
      anti_join(stop_words) %>%
      count(word, sort = T) %>%
```
```

```
      na.omit() %>%
      filter(n>=1000) %>%
      ggplot(aes(x=reorder(word,n), y=n, fill=`Class Name`))+
               geom_bar(stat = "identity")+
               coord_flip()+
               labs(
                 x="Kata",
                 y="Frekuensi",
                 title = "Grafik Frekuensi Kata"
               )+
               theme_linedraw()
  })

  output$plot_freq_kata = renderPlotly({
    ggplotly(plot_freq_kata())
  })

  plot_kata_digunakan = reactive({
    wclothing %>%
      filter(`Class Name` %in% input$`Class Name`) %>%
      unnest_tokens(word, `Review Text`) %>%
      anti_join(stop_words) %>%
      inner_join(get_sentiments("bing")) %>%
      group_by(sentiment, `Class Name`) %>%
      count(word) %>%
      top_n(10) %>%
      ggplot(aes(x=reorder(word,n), y=n, fill=`Class Name`))+
      geom_col(show.legend = T)+
      coord_flip()+
      facet_wrap(~sentiment,scales = "free_y")+
      labs(
        x="Kata",
        y="Frekuensi",
        title = "Grafik Penggunaan Kata"
      )+
      theme_linedraw()
  })

  output$plot_kata_digunakan = renderPlotly({
    ggplotly(plot_kata_digunakan())
  })

  output$plot_cloud_kata = renderPlot({
    wclothing %>%
      filter(`Class Name` %in% input$`Class Name`) %>%
      unnest_tokens(word, `Review Text`) %>%
      anti_join(stop_words) %>%
      inner_join(get_sentiments("bing")) %>%
      count(word, sentiment) %>%
      acast(word~sentiment, value.var = "n", fill = 0) %>%
      comparison.cloud(colors = c("#e82a60", "#5ae8a4"), max.words =
250, scale = c(4,1))
  })
```

```
  hitung_sentimenx = function(p)
{
  wclothing %>%
    filter(`Class Name` %in% input$`Class Name`)%>%
    unnest_tokens(word, `Review Text`) %>%
    anti_join(stop_words) %>%
    inner_join(get_sentiments("bing")) %>%
    count(sentiment) %>%
    filter(sentiment==p)
}

  hitung_ulasanx = function()
{
  wclothing %>%
    filter(`Class Name` %in% input$`Class Name`) %>%
    nrow()
}

  output$jumlah_positif = renderText({
    hitung_sentimen("positive")$n
  })

  output$jumlah_negatif = renderText({
    hitung_sentimen("negative")$n
  })

  output$jumlah_ulasan = renderText({
    hitung_ulasan()
  })

  output$jumlahpositif = renderText({
    hitung_sentimenx("positive")$n
  })

  output$jumlahnegatif = renderText({
    hitung_sentimenx("negative")$n
  })

  output$jumlahulasan = renderText({
    hitung_ulasanx()
  })

    hasilanalisis = function()
{
  if
(hitung_sentimenx("positive")$n>hitung_sentimenx("negative")$n) {
    sprintf("Varian %s Cenderung memiliki feedback Positif",
input$`Class Name`)
  }
  else{
    sprintf("Varian %s Cenderung memiliki feedback Negatif",
input$`Class Name`)
```

```
  }
}

  output$d_analisis = renderText({
    hasilanalisis()
  })

  output$plot_ulasan = renderTable({
    table_wclothing()
  })
}
```
```

**Listing 3.5** *Server* untuk memasukan ke *UI*

```
`run-app`
```{r run-app}
shinyApp(ui = ui, server = server)
```
```

**Listing 3.6** *Running program*

## 4. KESIMPULAN

Metode *Latent Dirichlet Allocation* (LDA) dapat digunakan dalam proses klasifikasi data dalam bentuk *text mining*. Penggunaan LDA sering digunakan untuk mengatur atau mengklasifikasikan data menurut topik pemodelan. Dengan mengambil keputusan yang tepat tentunya.

Dari hasil analisis sentiment yang telah dilakukan, dapat disimpulkan bahwa masyarakat lebih banyak merespon sentiment positif dibandingkan sentiment negatif. Menurut hasil wordcloud, semakin besar kata di wordcloud, kata tersebut adalah kata yang paling banyak atau sering digunakan dalam komentar.
```